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FIRST AERO WEEKLY IN THE WORLD

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

23
XIX

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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Australian Problems

TWO problems connected with the air are agitating Australia at the moment. One concerns the aeroplanes which are to be used on her internal air lines (quite apart from the discussion about flying boats on the route to Singapore) and the other is the outcome of anxiety for reserve supplies in case of war. Attention is drawn to the first by a correspondent whose article appears on pp. 351-352 of this issue. There are some Australian operators who do not want to use British aircraft, as they think American machines more suitable, and there are others who want to use British machines but say that they cannot get deliveries from firms in Great Britain owing to the expansion programme. The prohibitive import duties on American and German aeroplanes have been relaxed, and our correspondent foresees America capturing the Australian aircraft market as she once captured the car market.

It is perfectly true that the internal demands of the United States have resulted in the production of very fast passenger machines in such quantities that the surplus can now be sold at a reasonable rate in British Dominions. Quite naturally, American machines now dominate Canada, and the invasion of Australia is perhaps about to commence. It is a question whether America has been wise to concentrate so much on speed, and it is even more questionable whether Australia would be wise to follow that lead. In a thinly populated country with undeveloped ground communications, where on nearly all routes the aeroplane can beat the ground by days or even weeks, some hold that the wisest policy for the aircraft operator is to aim at economic speed, not at the highest possible speed. Profits, as apart from subsidies, must be precarious where the population is small, and speed is always an expensive commodity. Still, if the Australians demand speed, they will doubtless go to those firms which can supply it.

The question arises, if the British industry were not preoccupied with Air Ministry orders, would the firms be ready to design special types for Australian requirements? There may be a future for that class of aeroplane inside Great Britain, but it has not yet arisen. There can be no question of sending surplus products to the Antipodes. If the Australian market is to be held by the British industry, it must be with aeroplanes designed especially for that market. The production of a prototype is an expensive affair, and if the result is to be no more than orders for about a couple of dozen machines, firms can hardly be blamed if they look elsewhere.

On the other hand, the demand for aircraft in Australia is steadily growing, and will grow still further. If events follow their normal course, Australia must some day become a most valuable market. If a Home firm were to decide to design and sell at a small profit or even an immediate small loss in order to keep a grip on that market, there is every reason to suppose that in due time it would reap its reward. It is not many years since the only hope of immediate profit was in designing for the R.A.F., and the one or two firms which specialised on commercial types were looked on by some observers as reckless speculators. Those firms have certainly reaped their reward to-day, and that lesson should be taken to heart.

War Reserves

The supply of aircraft reserves in case of war is a very difficult problem. Australia has found that the present R.A.F. expansion has held up the expansion of the R.A.A.F., as British firms are behind with deliveries of the ordered machines. Things will be worse in a war, say the Australian authorities, and the only solution to the problem seems to them to be the founding of an industry in Australia. That is bound to be a very expensive affair for the taxpayer. R.A.A.F. orders, even for the expansion, are bound to be small, and the plant cannot possibly be worked to capacity. The Australian taxpayer will have to pay for the plant's idle time. Safety is naturally the prime consideration, and it looks

as if Australia will have to face that expenditure. It will be cheaper than defeat in war. The British example of a "shadow" industry would seem to give the best hint to Australia.

Engines offer a more serious difficulty. The multiplicity of types which is desirable in Great Britain would not be needed. If the main problem of Australian defence is to use air power against an invader from overseas who wants to effect a landing, it ought to be possible to narrow the limits of requirements. The authorities might decide that one type of engine—air-cooled, water-cooled, or liquid-cooled—was the most suitable for that class of defence, and might encourage manufacture under licence of the products of one or two firms which specialise in that class. Of course it would be necessary to keep up to date even inside those limits, but something on those lines offers a sort of solution of a difficult problem.

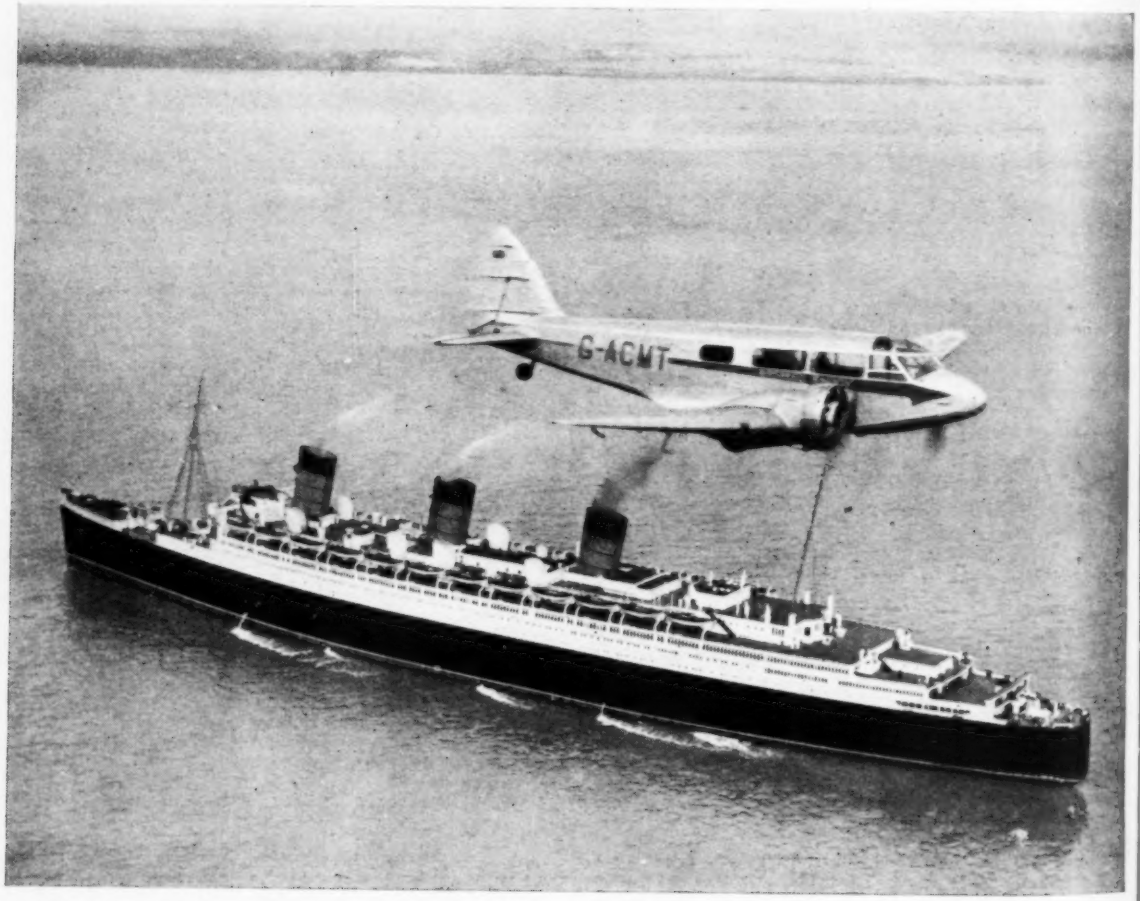
Above the Clouds

WHAT happens to air defence when bombers come in over a cloud bank? That is a question which is agitating many minds just now. The sound-locators can probably point out the direction of the raiders, but that would not be of much help to the fighters and the guns. Air Commodore Chamier suggested in his broadcast talk the other day that observation kite balloons could be sent up above the clouds by day, and that by night searchlights and guns could be sent up on aeroplanes. It is an interesting idea, and probably deserves investigation.

Some Difficulties

There are obvious difficulties, but they might be overcome. In the future bombers may be escorted on daylight raids by long-range fighters, and a kite balloon above the clouds could hardly be defended by a barrage of guns as it is in normal conditions. Unless a guard of fighter aeroplanes could be provided it would be very helpless. The idea of searchlights carried aloft on aircraft has attractions, but the noise of the aircraft's own engine would make it impossible to use a sound-locator, and without a sound-locator the beam would be a very haphazard searcher of the sky. Still, it might find a raider now and then, and point him out to the patrolling fighter on the defence side. So long as the beam can hold the bomber, all the odds are on the side of the defending fighter, and by night there would seem little use in sending an escort with the bomber.

If scientists can find some way of using a sound-locator in an aircraft which can carry a searchlight above the clouds, one problem of air defence will be made much less formidable.



LINERS OF TWO ELEMENTS: This fine aerial picture of the *Queen Mary* was secured by *Flight's* photographer over Cowes Roads last week. The Series II Envoy—from which, incidentally, the Airspeed Company's joint managing directors, Messrs. N. S. Norway and A. Hessell Tiltman, were viewing the liner—was flown by Flt. Lt. C. H. A. Colman.

The Outlook

A Running Commentary on Air Topics

The Air Navigation Bill

THERE is nothing to shock or surprise the public in the Air Navigation Bill, the second reading of which was moved by Sir Philip Sassoon in the House of Commons last Monday. It has received plenty of advance publicity, and the main provisions were described and discussed in *Flight* in the issue of February 6 last. None the less, the Bill is very welcome, and the Under-Secretary for Air remarked that there was less likely to be opposition to its provisions than complaints that the reforms proposed were long overdue.

Sir Philip explained to the House that there were five main points in the Bill, (1) enabling the Air Minister to make subsidy grants of one and a half million pounds, instead of only one million per annum, up to the end of the year 1953; (2) the handing over of control of airworthiness matters from the Air Minister to an independent body representing civil flying interests; (3) allowing the licensing by Orders in Council of air transport services; (4) permitting metropolitan boroughs to acquire land compulsorily for aerodromes; and (5) compulsory insurance against third-party risks, with a limitation of liability of the aircraft owner.

Greatest Natural Obstacle

MOST far-reaching in its importance is the subsidy clause of the Bill. Its main object is to enable air transport to attack what Sir Philip called "the greatest of the natural obstacles with which air transport is confronted, namely, the Atlantic." Imperial Airways need money to enable them to tackle that obstacle, and the Air Ministry must be able to provide it. No transport company would undertake the task unless it could count on a long-term agreement, and this clause will enable the Air Ministry to conclude such an agreement. The public and the Houses of Parliament are now so air-conscious, and so anxious to see British air transport hold its own against all foreign competition, that there was not very much opposition to this clause. There are some members who are opposed to the principle of entrusting all these long-distance enterprises to the same company, but surely it is reasonable that when the greatest natural obstacle of all is to be attacked, the onslaught should be entrusted to the only hands which have gained experience and proved their competency. The Bill does not tie the Air Ministry to Imperial Airways, but it is common knowledge that that company is to be the chosen representative of Great Britain in spanning the Atlantic. Even those who are opposed to Imperial Airways found no reason for opposing this clause in the Bill.

Freed from the Shackles

THE handing over of airworthiness matters to an independent body was described by Sir Philip (doubtless with his tongue in his cheek) as "the liberation, to an extent at least, of Civil Aviation from the shackles of the Air Ministry . . . the freeing of Civil Aviation from what has been described—with how much accuracy I will not attempt to say—as bureaucratic control." The clause embodies a recommendation of the Gorell Committee, for the setting up of which *Flight* claims a certain amount of responsibility. There will certainly be no opposition to this clause, and private owners will rejoice in the added freedom and probably reduced expenditure which they will gain from it.

There is nothing contentious in the giving to metropolitan boroughs the powers which other boroughs have already received, and which they have had by a series of temporary measures, of compulsory acquisition of aerodrome lands. The compulsory insurance against third-party risks, with a limitation of liability, has been widely discussed and generally approved.

The power to license air services is another attempt to be practical rather than idealistic. To some extent it may limit the freedom of trade, and were it not that the Orders in Council must be submitted to Parliament, it might also be stigmatised as bureaucratic control. To check the loss involved by wasteful and unnecessary competition on inland air routes is, however, conferring a practical benefit on the public. The Bill was given a second reading.

Exit a Theory

NEWS that the U.S. Navy has placed a large contract with the Douglas Company for torpedo-bomber monoplanes for carrier operation sounds the death-knell of yet another die-hard contention.

It seemed at one time that naval air arms were resigning themselves to "stick and wire" biplanes. Monoplanes, it was generally maintained, could not be made compact enough to permit their use from aircraft carriers; with certain modern forms of construction wing-folding would present great difficulties; the high landing speed, at one time almost universally regarded as an insuppressible vice of monoplane designs, would also render the type useless for carrier operation.

Douglases are building 116 answers to these archaic theories.

Details of the machine concerned are lacking. It is, however, a low-wing monoplane mounting the new Pratt and Whitney Twin Wasp. Whether or not the wings are made to fold is uncertain. Possibly the compactness renders this unnecessary.

Resumption of "Flat" Racing

A STUDY of the King's Cup Race regulations on page 361 of this issue seems to indicate that the course for the eliminating trials has been selected this year by "flat-racing" enthusiasts! It lies mainly over flat country, and nowhere, apparently, will competitors have to cross hills of more than about 1,000ft. in height. This is in contrast to the country used in several previous King's Cup Races. In last year's eliminating event, too, one competitor actually was forced down in the sea, and another barely escaped a similar ducking; fortunately the pilots suffered no serious harm, and the mishaps did serve to draw attention to the risk of race-flying over sea.

This year the Racing Committee of the R.Ae.C. has evidently set out to avoid sea crossings altogether, a decision with which few will quarrel, although it seems a pity to leave Ireland out of the race altogether. But it is a little more difficult to see the reason for leaving Scotland and Northern England out. The course selected makes Nottingham the northernmost turning point in the race, and the course certainly avoids hills of any great height. That, however, is barely a good and sufficient reason for depriving the northern parts of the country of an opportunity of seeing the competing machines.

On the other hand, there is something to be said for changing the turning points from year to year, and the only aerodrome "repeated" in this year's eliminating course will be Hatfield, the starting and finishing point. The towns which *are* to see the machines will see them twice, and at Hatfield there should be plenty to watch.

FIVE MONOSPARS

Specialised Standard Equipment on the Latest Versions of the S.T.25 : Trimming Tabs for New Models : The De Luxe Monospar in the Air

ON more than one occasion it has been said that when aeroplanes are sold complete in every necessary detail then flying can be considered to have become a properly recognised means of transport. Last year the General Aircraft Company introduced a five-seater, twin-engined Monospar, which, in its standard form, carried full night-flying equipment, including a landing head light in the nose, blind-flying instruments, and a radio homing and receiving set, in addition to a number of other refinements which have been part of the equipment of cars for a decade.

This year the scheme has been carried a stage farther. The Jubilee model, as it was known, has become, so to speak, a foundation on which five new types have been erected. Based on the very same standard equipment, the new models have additional equipment specially suited to the needs of operators as well as of private owners. The corner-stone is the Standard, with the De Luxe model for the more particular private owner, and the Transport for the small air line or taxi operator, while the Freighter and Ambulance are similar, respectively, to the De Luxe and Transport models, save that the internal fittings have been designed specifically for the duties which the names indicate.

The plan form of the S.T.25 wing is admirably shown in the flying picture above, while that on the right gives a good impression of the wide field of view available for both pilot and passengers. The position of the adjustable landing light in the nose can be seen in the view on the left. (*Flight* photographs.)

Needless to say, the private owner who holds a radio licence, or who has his own professional pilot, may prefer the Transport model if he is to use his machine for very serious touring. This machine has, in place of the normal homing equipment, an R.T.E. receiver and transmitter as well as a Sperry artificial horizon and directional gyro panel, special instrument lighting, and, of course, slightly modified cabin equipment.

Generally speaking, however, the De Luxe model may be taken as representing the 1936 type of S.T.25. To the casual observer three new features are immediately noticeable. A tab on the elevators is used for longitudinal trim in place of the adjustable tail plane; directional trimming is now possible since an adjustable tab is fitted also to the rudder; and directional stability has been attended to by the use of increased fin area. The engines are Pobjoy Niagara IIIs, with Rotax electric starters. However simple the "pull" cabin starter gear of the previous model may have appeared to the normally brawny owner, button starting will certainly be an improvement thereon.

Inside the cabin, too, the changes are marked. A completely redesigned dashboard carries the latest version of the R.T.E. homing receiver, and there is a special switch-box immediately in front of the pilot for the electrical controls, including the starter buttons, and for the rudder bias lever. With the elevator tab now fitted, the trimming control consists of a very small and conveniently placed lever, on the port side of the cabin, moving through 180 degrees. The landing headlamp switch and its angle adjustment control are mounted beside this trimming lever and in their usual place. Apart from the normal flight instruments, which include a Smith turn and bank indicator and the homing indicator, the equipment, as before, includes Ki-gas engine priming installation, an Essex fire extinguisher and a dial-type fuel gauge which is mounted between the front seats. The screen is now in three pieces with a safety-glass centre panel, and special attention has been paid by Rumbolds to the upholstery and to the soundproofing arrangements.

The dashboard position for the R.T.E. homing receiver brings it within easier reach of the pilot, who is now able to read the tuning dial with accuracy and, consequently, to make greater use of the equipment when flying alone or with passengers who do not understand its operation.

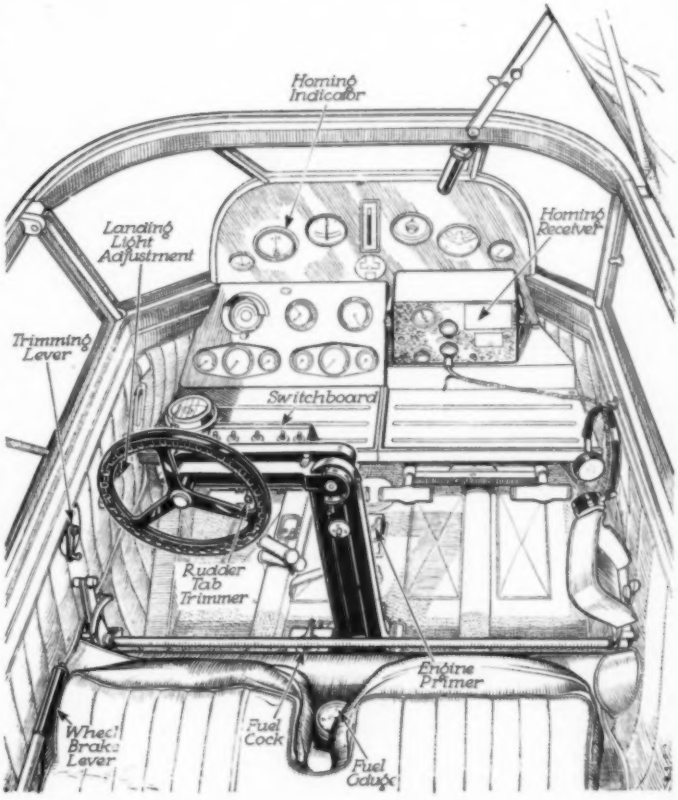
Although the majority of broadcasting stations in this country are situated at distances of ten to thirty miles

from the nearest aerodrome, the examination of a ten-mile aviation map suggests that quite good use could be made of them on the majority of long flights, and during the summer months the weather broadcasts from Borough Hill, Daventry (on 1,181 m.), will be virtually continuous throughout the day and part of the night. The importance of up-to-date knowledge of developing weather conditions cannot be overestimated.

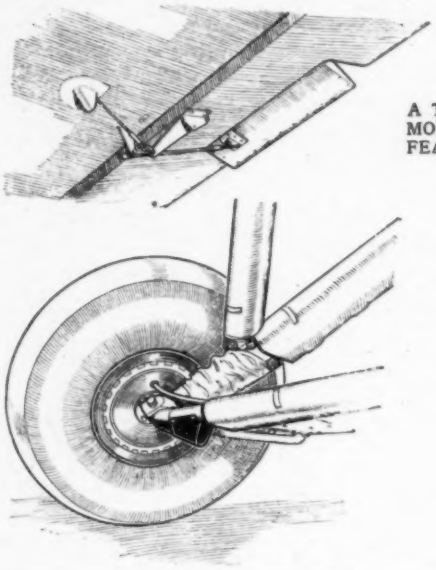
On the Continent there are, according to a list worked out by the Automobile Association, no fewer than forty stations which are less than ten miles from an aerodrome, and, of these, seventeen are three miles or less from the appropriate landing ground. For Continental work, therefore, the homing equipment can form much more than a mere check on the direction of one's peregrinations.

In practice it is probably easier to use the indicator, the earphones and the compass together during a long period of homing. A short test between Hanworth and the Brookmans Park transmitter showed that no difficulty was experienced either in holding a course both towards and away from the station or in stopping a steepish turn accurately on the correct course. The air was a trifle bumpy even at 2,500ft., and it was impossible to keep the needle absolutely steady, yet the machine returned to Hanworth on "back bearings" quite accurately when allowance was made for the natural drift on a course which was slightly off-wind.

So far as the flying qualities of the new model are concerned there is little change, though the effect of the increased fin area would probably be noticeable in really bad weather. When flying light, at least, the De Luxe S.T.25 can be trimmed to fly both hands and feet off so far as the directional and fore and aft axes are concerned. With the tab balances on the ailerons these are so light that lateral corrections are made



The control and instrument layout of the new De Luxe model. In its production form the "pull" starters seen below the control wheel will not appear, since the Niagara III engines are fitted with Rotax electric starters.



A TRIO OF MONOSPAR FEATURES

The two sketches on the left show one of the aileron tab balances and the jacking pad beneath the axle, while the new tab trimmers on rudder and elevator can be seen above.

quite effortlessly and the lack of inherent stability in this axis is no hardship.

The new tab trimmers, however, are a considerable boon from the pilot's point of view. Never a very arduous business with the standard trimming wheel, fore and aft adjustments are now carried out with the little lever which moves only through a half-circle with a radius of perhaps three inches. Another small lever, also within easy reach, operates the rudder tab, and this can be set to take all the load off a rudder control which, in any case, is very light. This directional bias will not take all the effects of a dead engine, but it reduces the amount of necessary rudder pressure to a minimum. Turns, incidentally, can be made against a throttled motor quite easily.

As a flying machine the S.T.25 is decidedly interesting, since all the controls are light and very effective. The human animal's pedal extremities being the least controllable, it is as well, perhaps, that the rudder is the softest. This, however, is powerful enough to hold the nose properly up in a sideslip. The controls, in fact, are sufficiently exciting to tempt the enterprising owner to fly in a manner which might not please his less youthful passengers. Tight turns, for instance, are so effortless and natural in their development that they tend to become a stock-in-trade manœuvre.

The majority of machines have to be known to be understood—the Monospar, perhaps, more than some, though the characteristics of the low-wing monoplane are becoming sufficiently well known to require no comment. With little previous experience of the machine, only two of some half-dozen approaches made into Hanworth required more than a shade of engine or slipping adjustment, yet this aerodrome is by no means large, and the buildings on the perimeter are always liable to cause one to misjudge an approach even with a familiar aeroplane.

The S.T.25 is gliding under full control at 60 m.p.h., and at this speed height can be lost quite usefully so long as the nose is put down a little in order to have a reserve of momentum for the hold-off. A normal approach is best made at 70 m.p.h., since at higher speeds the actual approach angle is much flatter. Deceleration is fairly rapid at lower speeds, so that, if care is exercised during the last phase of the approach, the amount of aerodrome used is disproportionately smaller than one would expect.

Of six landings by one who had never previously made any on this machine, the first had to be washed out, the second was bad, the third was good but shaky, and the final three were firm and clean. Obviously, therefore, there is nothing really difficult about the S.T.25 from that point of view. The newcomer might be misled by the efficiency of the elevator control at low air speeds and be surprised into making a series of paraboloid motions. Once the machine is held off, in fact, no progressive backward movement of the control is necessary as the speed drops.

While on the subject of landings it is worth remembering that, once the S.T.25 is firmly down, it is safe to apply the Palmer brakes with full force. This was done more than once during the trial, and the pull-up on dry turf is extraordinarily smooth and rapid. A pressure gauge on the dash gives the pilot an indication of the braking power in use and is particularly valuable while taxying.

With the throttles back the machine stalls at a little more than 50 m.p.h (indicated), and one wing usually drops quite gently at the final moment of full stall. Control remains until the last and is recovered quickly enough to prevent the wing from falling too far, since the nose drops and the speed rises again immediately. On full throttle it is possible to hold the machine up at speeds as low as 45 m.p h. without loss of height, and in this case, of course, the rudder becomes the dominant controlling factor.

MONOSPAR S.T.25 DE LUXE.

Two Pobjoy Niagara III 90/95 h.p. Engines.

Tare weight with all equipment	1,758 lb.
Disposable load	1,117 lb.
Span (folded)	11ft. 10in.
Length	26ft. 4in.
Height	7ft. 10in.
Cruising speed at 3,200 r.p.m. (77% power)	123 m.p.h.
Duration at this speed	3 81 hr.
Rate of climb at sea level	700 ft. min.
Service ceiling	12,000ft.
Take-off in still air	195 yds.
Landing run with partial braking	120 yds.
Landing speed	54 m.p.h.

Prices (with full equipment)

Standard model	£1,750
De Luxe ,,	£1 985
Ambulance ,,	£2,550
Freighter ,,	£1,700
Transport ,,	£2,250

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

BACK TO THE LAND: The Boeing 299 makes a finely judged aerodrome approach over a maize field.

LAST week Flt. Lt. "Tommy" Rose talked to the boys of King's College School, of which he is an old boy.

The French Navy has officially accepted the aircraft *canon*.

A special "Executive" model Lockheed Electra with two 550 h.p. "H" Wasps does 215 m.p.h.

Mr. James Frazer, the New Zealand parachutist, was killed on Sunday when his parachute failed to open.

The special Potez biplane with which Maryse Hilz will attempt to break the altitude record is nearly finished.

Bredas are building a 250 m.p.h. twin-engined bomber to have a range of 1,240 miles with a 6,600 lb. military load.

During operations in Abyssinia the Italian air force has flown 20,000 hours, dropped 2,000 tons of explosives and fired 300,000 bullets.

M. Drouhillet, aeronautical adviser to Haile Selassie, has been refused permission by the French to deliver an American Beechcraft to Abyssinia.

The U.S. Navy has ordered 114 torpedo-bomber monoplanes with Pratt and Whitney Twin Wasp engines for carrier operation.

Heil Storm

According to Doctor Eckener, Commander of the Zeppelin L.Z.129, all passengers on board that airship and her sister ship the *Graf Zeppelin* recorded their votes for last Sunday's election while in the air.

A "Worcester" Scholarship

A member of the Air League of the British Empire has presented a scholarship of £50 a year for two years to the Thames Nautical Training College, H.M.S. *Worcester*, to assist a cadet to become an officer in the Royal Air Force. Applications for the scholarship should be forwarded to the Secretary, Ingress Abbey, Greenhithe, Kent, before June 15, 1936.

Twenty-five Years Ago

(From "Flight" of April 1, 1911)

". . . the disappearing axle on the Sanders biplane. By releasing a catch the axle and wheels are drawn above the level of the skids, on which latter members the machine can therefore land direct."

The Mollisons

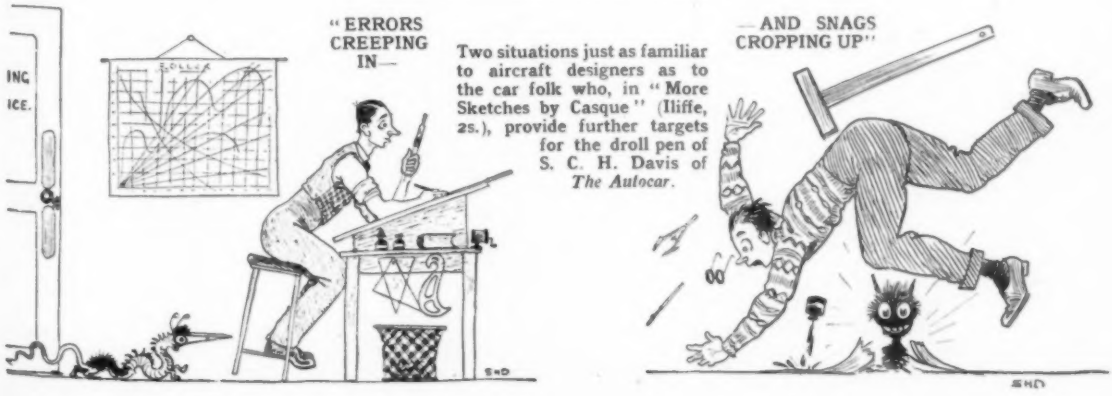
Mr. James Mollison plans to make a 21-day solo flight round the world this summer. Mrs. Mollison has denied the report that she has designs on the Cape record. She was said to have intended to use her Beechcraft, now at Croydon Airport.

The Garbo Touch

For the benefit of those who want to be alone, the Douglas company has made an alternative arrangement of the D.S.T.'s cabin. A private compartment providing sleeping accommodation for two and seating for four replaces the first two sections in the standard sixteen-berth machine. The D.S.T., incidentally, is being offered with Wright Cyclone Gs or Pratt and Whitney Twin Wasps.

Who Said Wheel Brakes?

A novel method of dealing with a snow-covered airport has been carried out with great success at Bradport, America. Instead of laboriously clearing runways, the snow is thoroughly rolled, with the result that the smooth, hard surface affords a good landing ground.



Two situations just as familiar to aircraft designers as to the car folk who, in "More Sketches by Casque" (Iliffe, 2s.), provide further targets for the droll pen of S. C. H. Davis of *The Autocar*.

SILENCE WITHIN

How the Cabins of Modern Aeroplanes are Sound-proofed : Problems to be Solved : Whispers and Snores

SOME of the difficulties encountered in attempts to silence extraneous aeroplane noises were touched on in a recent article (*Flight*, March 12, 1936). It was seen that, although the use of slow-running airscrews, cleaner aerodynamic design, and muffled exhausts has brought about a tangible improvement, a vast amount of work remains to be done.

The "silencing" of cabins is a simpler task, but even so has presented, and still presents, a multitude of widely varying problems.

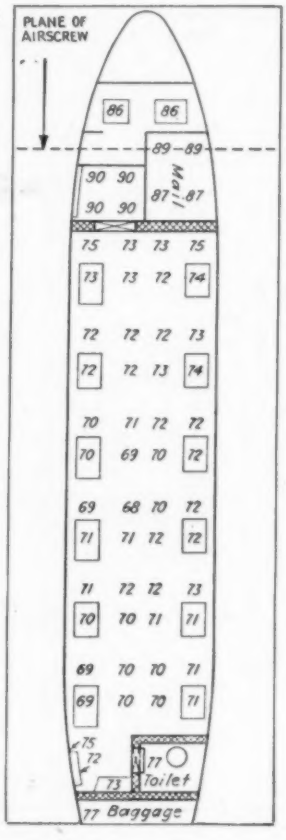
It is not long since wads of cotton wool formed almost the entire protection of a passenger's ears against the engine and airscrew noise which swept in through the thin fabric walls of cabin aeroplanes. In many machines even shouted conversation was next to impossible, and it is safe to say that the booking receipts of operating companies suffered very considerably as a result. The noise experienced during an actual flight was deterrent enough, and the painful deafness which followed often overshadowed any pleasant memories.

The aircraft operator knows only too well the difficulty of getting something for nothing. If he wants a thoroughly comfortable, quiet aeroplane he must sacrifice precious payload; and that, actually, is what he has been doing in recent years. But such sacrifices on the altar of silence are doing much to retain patrons of the air lines, besides attracting new ones, and are deserving of yet greater consideration by designers and operators.

From the Ground Up

It is a highly unsatisfactory procedure to build a transport aeroplane and then to call in a sound-proofing expert. The whole problem of noise reduction should be tackled in the early stages of design. Ample allowance can then be made for the lagging of cabin walls with appropriate materials, for insulation and for anti-resonance treatment. The closest collaboration is necessary between those responsible for structural design and an expert, or experts, in sound-proofing, ventilation and upholstery.

Some indication of the improvements which can be effected in a noisy aeroplane by the application of modern processes is given by the following instances. When the first Boulton-Paul P.71a feeder-line biplane (two Siddeley Jaguars) built for Imperial Airways was first flown fully furnished, but without sound-proofing, it proved itself a very noisy aeroplane, giving an audiometer reading of 94-95 decibels. Rumbold and Co. were given a free hand to remedy this, and succeeded in getting the reading down to 74 decibels—a distinctly creditable figure. The Monospar S.T.12 (two Gipsy Majors) was similarly reduced from 94 to 76 decibels. This was an unusually tough proposition, for not only was the fuselage fabric covered, but the tips of the airscrews were abnormally close to the cabin walls.



A diagramatic representation of the noise level distribution in the cabin of the Douglas D.C.1 cruising at 75-80 per cent. full power and carrying twelve passengers but no mail nor baggage.

The cabin of the Douglas transport gives a reading of from 69-75 decibels when the machine is cruising at 75-80 per cent. power. Its complete Sperry sound-proofing system weighs, roughly, 250 lb. The big Martin *China Clipper* is said to be even quieter, giving a reading of 65 decibels.

Audiometer readings, of course, are taken when a machine is in flight; otherwise they would be false owing to the vibration experienced on the ground. Noise increases with speed, but decreases very considerably with height.

The position of engines and airscrews in relation to the passenger cabin is obviously of the greatest importance. Exhausts should be led above or below a wing to blanket off the noise, and airscrew tips should be at least 10-12 inches away from the cabin. The biplane with engines between the wings (happily an obsolescent arrangement) is undesirable because the noise is trapped between the upper and lower planes alongside the cabin. It is advantageous to keep passenger seats out of the plane of the airscrews. In a number of machines, including the Handley Page 42 and Short *Scylla* class machines of Imperial Airways, lavatories, kitchens or luggage compartments may be placed in that position.

It is generally agreed that the easiest type of cabin to silence is that of a metal monocoque machine: the hardest is the

rectangular "stick-and-wire" fabric-covered structure. Small, rigid windows are desirable, and should be mounted in rubber. If the weight allowance of the machine and the pocket of the purchaser are favourable it is advantageous to have them made of thick safety glass. Failing this, thick rubber-mounted panels of some transparent plastic material like Rhodoid and Perspex make admirable substitutes. It is of the utmost importance that doors and emergency exits should fit tightly. The Douglas embodies a particularly interesting type of door in which pressure is evenly distributed on the gasket, ensuring a perfect fit when the door is closed.

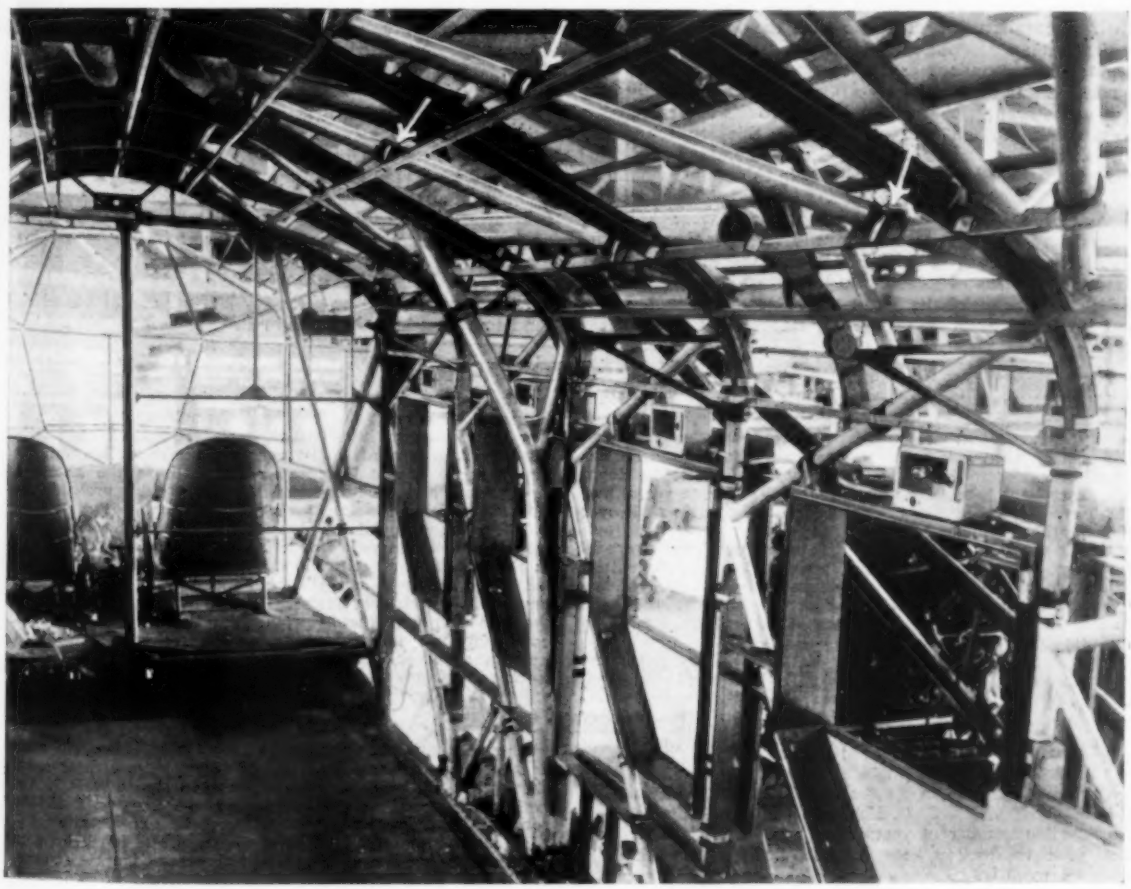
In a typical modern twin-engined transport machine engine vibrations may be transmitted through the engine bearers to a spar and thence to the fuselage and the remainder of the structure, the whole of the machine acting as one great tuning fork. Consequently all fittings such as doors, chairs and luggage racks should be thoroughly insulated by tape, leather, rubber or other suitable material. It would be beneficial to insulate, if possible, the spar roots from the fuselage, perhaps by rubber, but structural difficulties are then liable to arise. It goes almost without saying that some form of resilient engine bearer should be incorporated.

Bare hardwood panelling and linoleum on the cabin floor should be avoided in order to secure the best results. Everything, in fact, should be kept as soft and absorbent as possible. Leather has been proved to possess quite remarkable sound-absorbing qualities. Window curtains and the soft upholstery of the cabin walls help to absorb the noise reflected from side to side of the cabin. A highly desirable, but somewhat weighty, floor covering is a thick carpet with a layer of acoustical felt beneath.

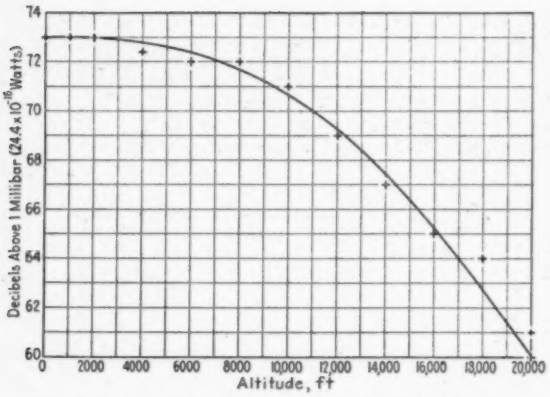
The ventilating system of a modern transport machine is usually planned by the constructors themselves, because it is likely to affect the fuselage structure. It has, of course, a close bearing on the problem of noise reduction. Air should be taken from as far forward in the fuselage as possible—a position in front of the airscrews. An all-metal piping system does not give the best results, but rather a rubber one, or at least one embodying a number of rubber connections. In certain up-to-date machines there is some form of sound filter in the ventilation intake. The new Monospar S.T.18, for example, employs a perforated tube in a cloth bag filled with absorbent materials, which virtually filters the noise from the air stream.

The main feature of any modern sound-proofing scheme is the lagging of the cabin walls with some sound-absorbing agent inserted between the outer skin of the fuselage and the cabin walls. Contrary to a popular belief, double walls without any form of sound-proofing are rarely better than a single surface. Another popular fallacy is that sound-proofing is by nature an insulation against cold and heat. This is true only in certain cases.

There is a wide range of sound-proofing materials on the market, but only a few of these are light enough for regular aircraft use. One which has met with great success is Seapak, which weighs, flame-proofed, and in its normal thickness of $\frac{1}{4}$ in., 8 oz. per square yard. It takes the form of soft, resilient sheeting made from the fibres which come



The Curtiss Condor (two Cyclones) is a particularly quiet transport. This view shows some of the insulating measures—indicated by arrows—which have been taken in its Sperry-proofed cabin.



How the noise level decreases with increasing altitude.

from the hard-shelled pod of the tropical ceiba tree. In other words, it is kapok. It is flexible, can be cut to shape or formed, and is easily applied—often in corrugated form with a flat backing of the same material. Seapak also serves as a temperature insulator, enabling systems of forced ventilation continually to change the air and the heating arrangements to maintain a constant temperature.

Mr. Jack Frye, vice-president of Transcontinental and Western Air, states that on night flights in the Seapak-proofed Douglases operated by his company it has been necessary to request passengers to talk in low tones because their voices disturb others who wish to sleep.

Seapak can be applied in layers, it can be corrugated or crumpled, and sometimes is made up into the form of "egg boxes" filled with Silpak—a material developed by the silk industry and claimed to be fireproof and impervious to moisture. The agent for Seapak in this country is Mr. H. L. Williams, of 72, Oxford Street, London, W.1.

Another material used extensively in this country is Cellocol, handled over here by Christiani and Neilsen, Ltd., Romney House, Marsham Street, London, S.W.1. This has both sound- and heat-insulating properties (its thermal conductivity is about 0.21 B.T.U. per 3 sq. ft. per hour) and is manufactured as standard in rigid sheets measuring 4 ft. by 3 ft. The weight is about 1¾ lb. per cubic foot, without its doped linen covering. By nature it is a synthetic pith, and for aircraft use is made fire-resisting. It can be supplied in any thickness up to 3 inches.

The Sperry Company has developed an interesting process employing an inexpensive fabric or any material which can be stretched. This gives an exposed continuous surface which is claimed to be strong, smooth and easily decorated. Fire-resisting paint can be applied, and the material can be washed whenever soiled. A special kind of felt is cemented behind this stretched cloth, being quite invisible from the cabin. The great feature is that the light membrane in tension, combined with a sound-absorbent damping material, can be readily vibrated by the sound waves. Neither material alone gives the desired efficiency.

The modern sound-proofing scheme does not interfere with the appearance of the cabin or the comfort of the passengers. Veneer ply with or without upholstery or any other decorative scheme will conceal the handicraft of the sound-proofer.

In the case of metal monocoque fuselages it may be helpful to spray a thin coat of latex between the outer skin and the bulkheads, and also in the overlap between the plates themselves. When the utmost silence is not necessary it is economical to apply marine glue and a special type of brown paper to absorb drumming. The glue, it is said, prevents the paper absorbing moisture and setting up corrosion.

A resonance-reducing process has lately been put on the market by Cellon, Ltd., entailing the coating of metal panels with fibrous particles of cotton, silk or wool. The exact nature of the fibre to be employed depends on the type of surface to be treated. Where a surface would eventually be concealed by upholstery or fittings a coarse grade of wool fibre suffices. Exposed surfaces, on the other hand, may be treated with a view to sound reduction and decoration. Silk or cotton fibres can then be utilised. The method of application is as follows: A special adhesive undercoat is brushed or sprayed on, and while this is in a tacky condition the appropriate fibrous particles are applied by a spray.

It has been found during experiments that a large amount of air may flow up inside the fuselage from the tail towards the cabin. Noise will take a similar course, so it may be advantageous to insert sound absorbing material well aft in the fuselage to eradicate drumming. In the region of the rear bulkheads certain machines have lightly-framed metal or three-ply luggage containers which tend to act as loud-speakers or drums.

FUEL AND WAR

WRITING on the subject of fuel supplies in a national emergency, Col. W. A. Bristow, chairman of Low Temperature Carbonisation, Ltd., remarks that a few years ago the idea of making petrol from coal was dismissed as an impracticable dream, whereas to-day many squadrons of the Royal Air Force have been flying on coal petrol for some years, and there are a great number of coal petrol filling stations all over the South of England.

"It is a fact" (he writes) "that at present Low Temperature Carbonisation, Ltd., and Imperial Chemical Industries can between them, with the complementary processes of low temperature carbonisations and hydrogenation, supply even to-day, in case of emergency, every gallon of petrol required by the Royal Air Force.

The arrangements for bringing oil to this country, and the situation of our oil storage depots, have been developed on the basis of peace requirements, and the increasing performance of aircraft has rendered these completely obsolete. Our many storage installations, which run from the North-East coast southwards to Portsmouth, are now all within one hour's range of the European coast, and, in the face of a determined and well-equipped enemy, would probably be destroyed within the first week of the outbreak of war.

"The country will, of course, be glad to hear that the men have been served with gas masks, but a 10 cwt. bomb in the middle of an oil tank will not be deterred thereby.

"The country is now about to spend an enormous sum of money on our defence forces. There is a very strong feeling that the first vote should provide for the establishment of a completely new storage system, and that there should be set up the strongest possible constructive programme for the further development of the British coal oil industry."

A THIRD SHORT

AS announced briefly in *Flight* last week, John Short, Ltd., was registered as a private company on March 20, with a capital of £20,000 in £1 shares. The directors are: Sqn. Ldr. C. A. Rea, Mr. T. F. Mase and Mr. John Short. For a considerable number of years Sqn. Ldr. Rea has been chief test pilot to Boulton Paul Aircraft, Ltd., a post which he resigned recently. Already he has obtained official approval for the firm to do its own inspection, and it has been placed on the official Air Ministry list of contractors for such work as lies within the scope of the company.

Premises have been secured on the edge of Mousehold aerodrome, and are being fitted up as an up-to-date sheet metal shop. Mr. Hodgkinson, who has been in charge of B.P. Aircraft sheet metal shops, has joined the firm, and already considerable orders have been promised by two aircraft firms. The engineering shops of John Short, Ltd., have been in existence for years and are ready to start production at once. Doubtless, when Boulton Paul Aircraft transfer to Wolverhampton, a certain number of their personnel will desire to remain in Norwich, and many of them may then find employment with John Short, Ltd.

BRITAIN MUST STUDY the AUSTRALIAN MARKET

American Aircraft Obtain a Footing in the Commonwealth Following Removal of Restrictions : Are British Constructors Giving the Australian Buyer What He Wants ?

By BRUCE FOSTER, B.C.E., D.I.C.

MASCOT AERODROME, SYDNEY, headquarters of a number of Australian air lines and of the Royal Aero Club of New South Wales. (*Photograph by Milton Kent, Sydney.*)

AN Australian who has lately been engaged in aeronautical work in England, the writer of this outspoken article maintains that the British aircraft manufacturer, by failing to study the needs of the Australian market, is letting the American constructor through the door left open by the recent removal of import restrictions. "Flight" does not necessarily agree with all his arguments, and editorial comment will be found on page 341.

A SHORT time ago some of the restrictions on the importation of American aircraft into Australia were relaxed, and almost immediately several of the air-line operators set about acquiring these machines. Up till then only British aeroplanes had been used, for the products of all other nations had been rigidly excluded. But on February 15 the first Stinson aeroplane, for Capt. P. H. Moody, was landed in Brisbane.

This is rather significant and bodes ill for the future of British aeroplanes in the Australian market. Perhaps, amid the frenzy of the armament race, the English manufacturer may be able to spare a few thoughts for "the shape of things to come" in the world of air transport. War may come—or it may not. That is one of the few statements that one feels quite safe in making in these days of rapid change.

If it does not, the colossal armament orders of to-day must be reduced, after some years, to a fraction of their present magnitude. It is then that the manufacturer will need every possible market for civil aircraft so that the chilliness of the economic breeze may be reduced as much as possible. It is likely that the demand for transport aircraft will have considerably increased in a few years' time, for the generation which was born just as aircraft became commercially usable is only just now growing up. The child who, at the age of five, looked up into the sky to see the first of the London-Paris aeroplanes is now attaining his majority. In another ten years he will be making his presence felt in the world and exerting considerable influence. Perhaps he will be urging the Government to follow a policy of reducing the cost of air travel to a minimum, so that it may be available to more than just the favoured few. And one cannot imagine that he will be content with any other method of carrying mails which is slower than by air.

But to return to a less pleasant thought—the other alternative—that war does come. Passing quickly over that time of mutual destruction (I leave the presentation of it to Mr. Wells and Mr. Korda), we come to the end of the war, when victor and vanquished alike are exhausted, materially, economically, and vitally, and the inevitable rebuilding of the world's social organisation starts. Such rebuilding will probably have to be carried out in the midst of economic storms due to the chaos of disjointed currency systems inseparable from the payment of war debts. In such an atmosphere the British manu-

facturer is going to need every market he can possibly get—and he may even need some others he cannot get.

So, either way, war or not, the civil market for aeroplanes is going to be of paramount importance to the existence of many British firms in the near future. How near that future is is not absolutely obvious, but a few years go by quickly. *And on February 15 the first Stinson aeroplane was landed in Brisbane*—and the Americans got their first footing in Australia.

I do not propose to delve into the reasons why the Australian authorities should have decided to allow American aeroplanes into Australia, or even the reasons why they should have thought fit previously to ban them. That belongs to the realm of Government policy, with which this article is not concerned. What does interest us, however, is why, when the ban is lifted, the American manufacturers should be able to sell there in competition with British manufacturers.

The Motor Parallel

What was the state of affairs in the motor car market some years ago? Australia was buying a large proportion of her cars from America, and the English car was poorly represented. This was because the American car, with its greater power, was more suited to the severer motoring conditions of Australia. No attempt was made by the English designers to produce a car for anything except the smoothly surfaced roads of England. The result was that the only people who bought British cars were those who wanted to run about city streets only, those with whom economic patriotism carried the day, and those whose judgment of excellence in transport was faulty. After some years of this the British manufacturers were forced to do better and managed to recapture some of the lost market, but they have never managed to get it back wholly, and never will. Many people have become accustomed to the American car, and if for no other reason than habit, they will continue to buy it.

It is in our hands to see that the same situation does not develop in aircraft. The start of such a state of affairs is perilously close. British manufacturers have their hands full of armament orders, and one hears of enquiries from the Dominions being turned away for this reason. But another reason lies in the products themselves, which have been and are being offered. *Where is the all-metal aeroplane which we can offer for sale on air lines?* I am not referring to the very big aeroplanes used only by Imperial Airways, but to the more numerous smaller sizes up to, say, the fourteen-seater. And have not the Americans had several examples of this type for sale for some time? One need only mention Douglas, Lockheed, Boeing, Northrop, and Vultee. *Flight* reports that the Holyman air line, operating to Tasmania, has ordered a Douglas. One could write reams on the relative merits of wooden and metal aeroplanes, and perhaps the merits of the wooden one could be proved. But that is not the point, for whatever our engineering arguments indicate about relative merits, a demand undoubtedly exists for aircraft of stressed-skin construction. The case of wood *v.* metal is not absolutely clean-cut, and different airline operators will hold different opinions. They will inevitably exercise their preferences even in the face of some difference in cost.

English manufacturers are now starting to develop stressed-skin aircraft for military work, but are they doing it for civil transport suitable for the Dominions? It is time this was done, for the Americans have a big start now that the Australian market is open to them. If the English manufacturers are dull and do not set out in rapid pursuit, that start will be converted into an overwhelming advantage which will for ever cripple their Australian opportunities. For, once Australians get into the habit of buying American products, they will continue, and the story of the motor car will be told again.

One does not question the ability of British designers to design, both as regards airframes and engines. We have innumerable examples to testify to their ability, the field of world records providing the most spectacular one. When a British attempt is made on a world's record, it is seldom that the objective is not reached, and we can only conclude that the excellence of the machine's design and workmanship and the skill of the pilot are responsible. The reliability and thoroughness of British workmanship are bywords and need no comments.

Enterprise in Design

But what one does question is whether the general policy of British design is not too slow. *Does it lack enterprise?* Perhaps it will be said that the policy is a conservative one—that it is one of not rushing blindly forward into traps and pitfalls. Admittedly, a policy of ill-advised rush is disastrous, but let us beware of that terrible word "conservative." Sometimes it is only used as a cloak to cover up slowness in grasping opportunities of advance in design.

When the design objective is seen and the technical designers set out for it they soon reach it. But are we not too slow in seeing it? We are behind the Americans in stressed-skin construction, and we should not be. But now that we *are* starting such work we will produce examples as good at least as theirs. So it is up to us to prevent the Americans capturing one of Britain's most valuable markets—Australia. And the same thing applies to the other Dominions. We can do it, but only by developing a range of transport aeroplanes, both wooden and metal, which will cover the field from the three- to the twenty-seater, so that the airline operator can choose something suitable for his work and can have some latitude in exercising his own preference, at least on the question of wood *v.* metal.

I hope I have not given any impression of condescension or patronage in my remarks on English designers and manufacturers. Such is not intended. But, as an Australian engaged here in England in aeronautics, the situation strikes me rather forcibly, and I cannot regard it as being anything less than economically perilous. For the manufacturers to go on enjoying the huge armament orders of the present with eyes shut to the markets of the future is nothing but living in a fool's paradise, and there can be no doubt about the ultimate result.

Forthcoming Events

April 13. Aero-8 Club: Easter *Pou-du-Ciel* Rally, Canute Air Park, Essex.
April 16. R.Ae.S. (Coventry Section) Lecture: "Aircraft Instruments," by Mr. J. E. Chorlton, 8 p.m., Armstrong Siddeley Canteen.
April 17. Norfolk and Norwich Aero Club: Annual Dinner and Dance.
April 18. Brooklands Flying Club: Four-club Dinner at the Park Lane Hotel.
April 20. R.Ae.S. Lecture: "New Light on Strength of Materials Afforded by Modern Physics," by Dr. H. J. Gough, Institution of Electrical Engineers. 6.30 p.m.
April 24. Bristol and Wessex Aeroplane Club: Annual Ball.
April 28. R.Ae.S. Students' Section Lecture: "Application of Aerodynamics to Mechanical Engineering," by J. L. B. Jones, 7 p.m., R.Ae.S. Library.
May 2-3. *Pou-du-Ciel* Rally, Broadway, Worcestershire.
May 10. R.Ae.S. Garden Party, Great West Aerodrome, Harmondsworth.
May 15-18. Yorkshire Gliding Club: Open Meeting and Competitions.
May 15-June 1. Stockholm Aero Show.
May 23. Empire Air Day.
May 27-June 4. Austrian Aero Club: Whitsun Tour.
June 6. R.A.F. Flying Club: Annual Display.
June 6-14. Czechoslovakia Aero Club: Tour.
June 20. Brooklands "At Home."
June 27. Royal Air Force Display, Hendon.
July 10 and 11. King's Cup Race.
July 18. Portsmouth Aero Club: Isle of White Race.
August 1-2. Yorkshire Gliding Club: Open Meeting.
August 15-30. Yorkshire Gliding Club: Open Meeting and Competitions.
September 5-6. Aero Club of Hungary: Week-end Aerien.
Nov. 13-29. Fifteenth International Aero Exhibition, Paris.

WELDING in AIRCRAFT CONSTRUCTION

Possibilities of Electrical Resistance Welding in Stressed-Skin Structures : Timing Welds by Mercury Valves With Grid Control

INTERESTING references to the possibility of using spot welding in the construction of stressed-skin structures were made in a paper by Mr. R. H. Dobson and Mr. R. F. Taylor, read before the R.Ae.S. the other day. Mr. Dobson, as most *Flight* readers will probably know, is works manager of A. V. Roe & Co., Ltd., Manchester, and the use of welded steel tube construction based on Fokker practice has been a familiar feature of Avro fuselages for several years, so that the authors of the paper have had long practical experience of welding.

Two forms of electrical resistance welding were dealt with in the paper: Seam welding and spot welding. The former has been used in the manufacture of main plane spars of nickel chromium steel strip, comprising two booms and a web, produced by the usual draw-rolling operation. It was explained that the two booms were roughly assembled on the web, and the whole spar then passed through guide rolls into the seam welder and between two pairs of electrode discs. The current was continually flowing between upper and lower electrodes, so welding the booms to the web. The finished weld consisted of a series of spots or stitches, spaced about nine per inch. The spacing was obtained by using a motor-driven variable inductance motor which varied the peak welding current and caused intermittent or stitch welding. By varying the speed of this motor the pitch could be altered at will. The process was very satisfactory, and a 15ft. spar could be assembled in three minutes, coming out of the machine perfectly straight. The spars had to be heat treated subsequently to give the desired physical properties by means of the tension electrical process. Comparative vibration tests carried out on seam welded and riveted spars for the Avro Tutor showed that the welded spar developed a slightly higher stress.

Spot Welding

In view of the part spot welding may play in stressed-skin construction in the future, the section of the paper which dealt with this subject may be quoted in full:

The electrical resistance process of spot welding has not received the attention which so useful a production process merits. Main plane spars have been produced by this method, but the seam welding process is more satisfactory for such components.

Spot welding shows up to good advantage when used in the manufacture of ribs, fuselage and wing fittings, cowlings and general sheet metal parts, whether in steel, aluminium or aluminium alloys. There are several aircraft in existence in this country having seam welded spars, spot welded steel wing fittings and spot welded aluminium ribs.

Electrical resistance spot welding consists essentially of clamping two or more pieces of metal to be joined between upper electrodes under pressure and passing a heavy current of low voltage from one tip to the other through the metal to be welded. The electrical resistance of the two contacting faces and the column of metal between the electrodes is greater than that of the electrodes and the column is raised to welding heat whilst under mechanical pressure and fusion occurs.

The factors governing the amount of heat in a weld are: (1) The current; (2) time of passing current; (3) electrode pressure.

These and other variables materially affect the resulting physical and metallurgical properties of the spot welds, and it is the accuracy with which these are controlled that determines to a large degree the success or failure of the process. The mechanical pressure is, of course, readily controllable and the magnitude of the welding current is in most cases governed by selecting the correct transformer tapping to suit the material being welded. The time of passing the welding current is rather more difficult to control, but may be done by means of relay-operated contactors, synchronous motor-driven switches, or by mercury valves, having grid control.

The last mentioned type is preferable as it is free from the troubles due to arcing and wear which are always associated with contactors and synchronous motor switches. It is capable of controlling the welding time from 0.01 sec. upward. Such accurate control of welding conditions does not appear to be really necessary when considering the ordinary steels, but it becomes essential in the welding of non-corrodible steels and light alloys. Table I gives the mean results obtained, using a spot welder with automatic control, in the welding of the ordinary steels:—

TABLE I.

Material.	M.S. Sheet.	B.S.I. Spec. 2 S 3.
	Load per Spot.	
Gauge.	Single Shear.	Double Shear.
22	1,100	1,700
20	1,600	2,300
18	1,900	2,700
17	2,400	3,400
16	2,500	4,200
14	3,400	5,600
12	3,900	6,600
10	5,800	8,400
Material.	**Carbon Steel.**	**D.T.D. Spec. 124.**
18	2,700	4,400
16	4,400	6,700
14	5,600	8,700
12	6,700	11,000
10	7,600	13,000

In the welding of the non-corrodible steels and light alloys contactor operated welders are not suitable. With these materials it is essential that the structure of the material on the outsides of the spot is unaffected by the welding heat, and this necessitates extremely short welding times ranging from 0.01 to 0.08 sec., together with fairly high currents, otherwise the corrosion resisting properties would be seriously impaired.

Using contactor controlled equipment on a 50-cycle supply, the variation in operation of the contactor determined by oscillographic tests may be as much as two cycles, and as under certain conditions of welding this variation may be 70 per cent. of the total welding time, consistent results are almost impossible of attainment.

Numerous tests have been carried out on Alclad to specification D.T.D. 118 welded on an ordinary welder with contactor control which have given very satisfactory physical properties, although the variation has at times been rather large due to insufficient control of the time of passing current and also owing to insufficient amperage being available. Table II gives the average figures obtained for different gauges:—

TABLE II.

Properties of Light Alloy Spot Welds.

Gauge.	Load per Spot in Pounds. Single Shear.	Double Shear.
26	168	308
24	243	392
22	336	530
20	425	952
18	458	951

It will be noted that as the 18s G. material is approached that there is a falling off in the strength; this is entirely due to the capacity of the machine being approached.

A large number of tests carried out on similar material, welded by means of remote electrodes and mercury valve grid-controlled equipment, have shown an improvement on these figures of 15 to 20 per cent.

It should be pointed out that this does not represent finality as numerous tests remain to be carried out before it can be decided what is the correct relationship between current pressure and time for optimum results in a given thickness.

There is, however, little doubt that with controlled conditions welds may be consistently produced which are strong, sound, and which do not penetrate to the outside surfaces of the material. As a result of these investigations I feel that the day is not very far distant when electrical spot welding will find extended use in aircraft construction and the possibility of stressed-skin structure being manufactured by this method should not be overlooked.

Modern methods of stressed-skin construction, whether for fuselages or wings, are of necessity expensive owing to the enormous amount of riveting entailed, and if such structures can, in future, be fabricated by spot welding, using remote electrode, a considerable saving in manufacturing costs may be effected.

There are no grounds for assuming that a structure fabricated in such manner will be any less efficient than a riveted structure.

THE R.Ae.C. ANNUAL GENERAL MEETING

A Good Year's Progress in Many Different Spheres of Aviation: Chief Points from the Club Chairman's Report

HELD in London on Wednesday, March 25, with the Duke of Atholl in the chair, the annual general meeting of the Royal Aero Club opened with a review of the year's activity by the chairman of the Club, Lord Gorell.

Lord Gorell said that there had been a steady and gratifying increase in membership, and went on to quote some statistics which showed the growth of the interested groups from which their membership might hope for many accessions.

A total of 1,368 new "A" licences were taken out during 1935, as against 1,168 for the previous year; 175 "B" licences were taken out in 1935, as against 137 in the previous year. At the end of the year current licences were as follows: "A" 3,353, as against 2,979 the previous year; "B" 583, as against 498 the previous year.

During the year the Club granted 955 Aviators' Certificates, a number slightly greater than that of the previous year.

Turning now to the aircraft themselves, the total number on the register on December 31, 1935, was 1,535, of which 589 were privately owned. This latter figure did not include club aircraft.

All these figures, said Lord Gorell, showed an increase, but lest they be unduly elated he would remind them they were still much below the figures of many foreign countries.

Encouraging the Air Tourist

Encouragement of touring had been given continued study, and they had again to record their grateful thanks to Viscount Wakefield, who in 1933 gave a donation of £1,500 towards this object.

The number of Carnets issued during the period was about the same as last year, approximately 550. This should not be taken as any diminution in the amount of air touring abroad. On the contrary, statistics showed that this was on the increase. The explanation was that each Carnet was available for a year from date of issue, and was employed over and over again. Indeed, they were so much employed that they were being continually renewed.

The combined efforts of the Royal Aero Club and its affiliated aero clubs in the various British dependencies and colonies, and the world-wide organisation of the Automobile Association, had facilitated air travel for British subjects all over the world.

Last year the Royal Aero Club took the initiative in forwarding the valuable scheme that the F.A.I. started the year before, namely, the giving of concessions to all club flyers presenting the member's identity card. Last year the scheme embraced nine countries. The efforts of the Club had resulted in the scheme being adopted by fourteen countries; with one or two exceptions these facilities were thus available throughout the whole of Europe. Lord Gorell expressed the committee's warmest appreciation of the co-operation given to this scheme by the aerodrome owners in this country. He thought it would result in a substantial increase in private air touring both to and from Great Britain. The aerodrome owners had thrown their bread upon the waters, and he thought it would come back to them as buttered toast.

The Club committee appreciated the importance of looking after the needs of the private owner. To this end they had appointed a special touring committee which dealt with the following subjects, among others: Admission of petrol and oil in aircraft free of Customs duty—this was taken up at Geneva and a favourable resolution obtained from the Transit Committee of the League of Nations; compulsory third-party insurance; the Air Navigation Bill; weather reports made more readily available; extensions of Customs facilities; landing and housing fees at government aerodromes; signals used in air navigation.

Apart from many conferences in this country, the Club had been represented at international conferences in Yugoslavia, in Paris, and at Geneva, and in this connection they were greatly indebted to their delegate, Lt. Col. M. O'Gorman.

During the past year the Club had accepted the pleasant responsibility of offering hospitality to foreign air tourists as a small return for the kindness so often received abroad. On this matter he would specially draw the attention of Club members to the "Week-end Aerien" on July 23-26. It was estimated that the cost of this week-end would be in the neighbourhood of £2,500, and although members and others had made very generous contributions there was a somewhat large amount still to be found.

Lord Gorell then went on briefly to review the outstanding sporting events and long-distance records put up during the year, and in doing so referred to the sportsmanship of Marshal Balbo, who, following representations made through the Club, secured the release of Flt. Lt. Rose after he had been detained at Bengazi for a technical infringement on his way back from the Cape.

Gliding Clubs' Activities

Gliding clubs formed the next section of the speaker's review. There were thirty-two such clubs in England and Wales, three in Scotland, one in Northern Ireland, and one in Jersey. The total membership exceeded 1,000. After referring to the gliding subsidy, Lord Gorell said that during 1935 the following gliding certificates were issued: "A," 112; "B," 83; "C," 49. This made a total of 244, which showed a great advance over the previous year, when only 90 were issued. At the same time, it was very much below the figures of other European countries.

Four Silver "C" Certificates, the highest award in gliding, had been granted by the International Commission for the Study of Motorless Flight to British soaring pilots in 1935, these being R. G. Robertson, C. Nicholson, J. C. Neilan and S. Humphries.

Turning to matters of legislation, the speaker said it was pleasant to note the ever-increasing interest in aviation matters taken by the members of the House of Commons, and the committee would like to record its appreciation of the efforts of the Parliamentary Air Committee, presided over by Admiral Sir Murray Sueter, a member of the club; the committee was showing the keenest interest in the Air Navigation Bill now before the House, and had promised to give their general support to the points put forward by the Club. He went on to thank the members of the R.Ae.C. who had given much of their time to matters dealing with aviation legislation.

The Financial Side

After a reference to the social side of the Club, looked after by a house committee under the chairmanship of Major H. A. Petre, Lord Gorell called upon Mr. F. Handley Page to make a statement upon the financial side of the Club's activities.

Mr. Handley Page, in presenting the statement for the year, announced that the majority of the large debenture holders, who provided the finance for the acquisition of the Club premises, had very generously presented the Club with their outstanding debentures, the proceeds from the gift to be devoted to the advancement of private flying, and for the commencement of a staff superannuation fund.

The following was a list of the donations so far received:—

Member.	No. of Debentures.	£
W. Lindsay Everard	20	500
H. Burroughes	10	250
T. O. M. Sopwith	34	850
H. O. Short	9 (£225) and a donation of £500	725
A. F. Sidgreaves	7 (£175) and a donation of £325	500
F. Handley Page	33	825
L. L. Irvin	32	800
C. R. Fairey	30	750
Stanley Spooner	10	250
Robert Blackburn	9	225
A. J. A. Wallace Barr	8	200
F. Sigrist	8	200

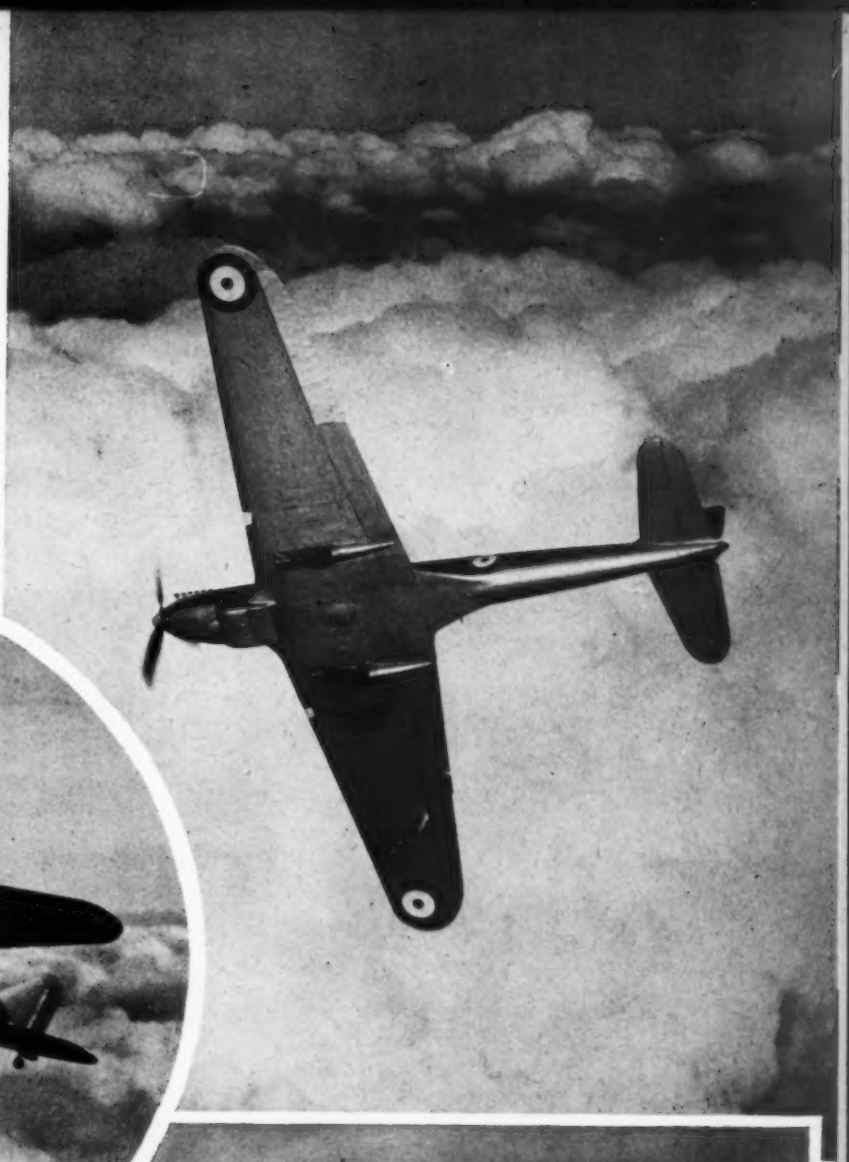
Finally, the following officers were elected unanimously:—president: The Duke of Atholl, K.T., G.C.V.O., C.B., D.S.O.; vice-presidents: The Duke of Sutherland, K.T.; The Marquess of Londonderry, K.G., M.V.O.; Viscount Wakefield of Hythe, C.B.E., LL.D.; Lord Gorell, C.B.E., M.C.; Lt.-Col. M. O'Gorman, C.B.

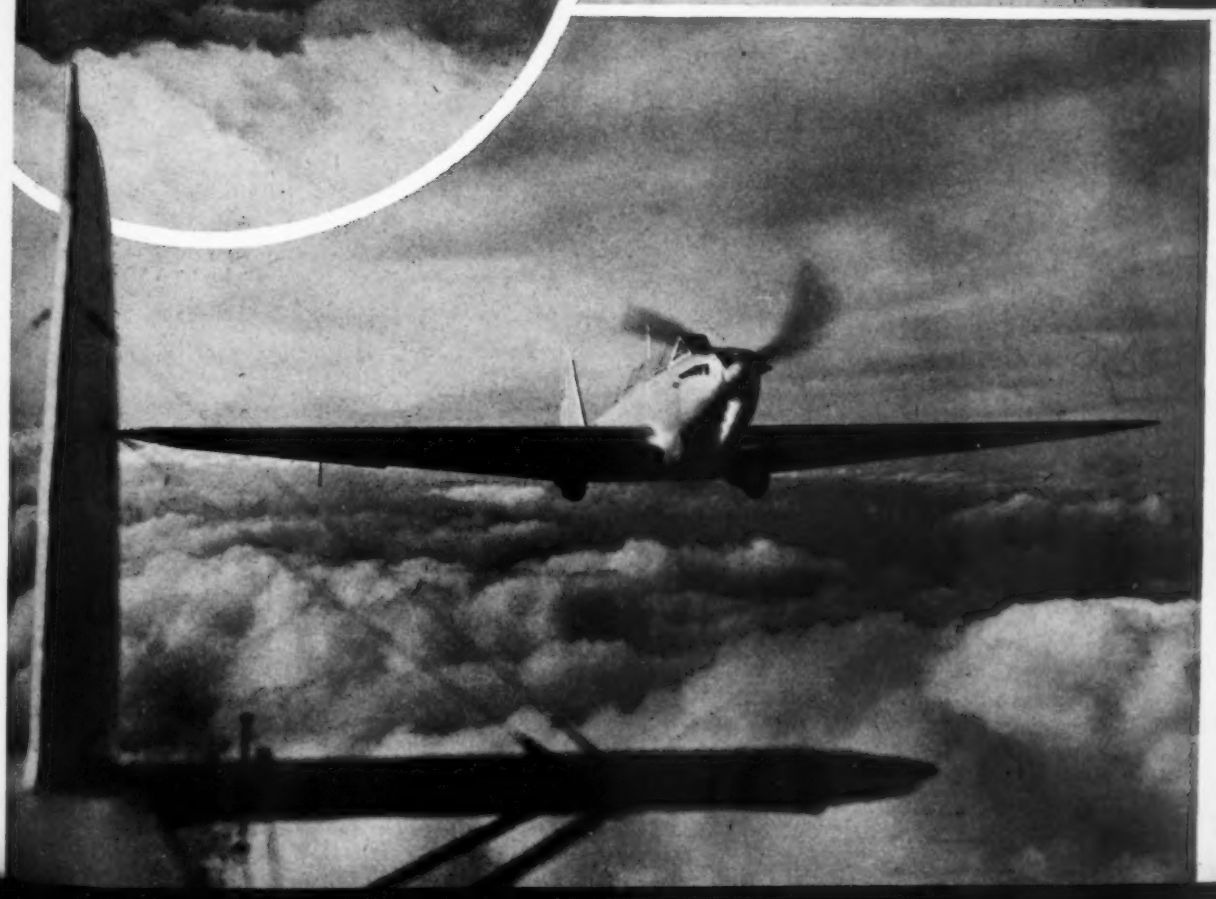
Committee (nine vacancies).—Major C. J. W. Darwin, D.S.O.; W. Lindsay Everard, M.P.; Major A. Goodfellow; A. C. S. Irwin; The Marquess of Londonderry, K.G., M.V.O.; Major R. H. Mayo, O.B.E.; Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P.; Lieut.-Col. M. O'Gorman, C.B.; Major H. A. Petre, D.S.O., M.C.

THE BATTLE and the BREEZE

Some New Aerial Impressions, by "Flight's" Photographer, of the Fairey Battle Bomber

(An illustrated description of this machine appeared in last week's issue)





TWO MONTHS and 16,000 MILES

The Story of an Out-and-Home Trip to India in a Short Scion (Pobjoy Niagara Engines) to Compete in the Viceroy's Trophy Handicap

THESE notes are extracts—purposely kept in their original form—from the log of the Short Scion G-ADDT (two 90 h.p. Pobjoy Niagara II engines) which Mr. C. E. Gardner took on a no-trouble trip to India, accompanied by Messrs. Peter Mursell (Navigator) and W. Coppen (Engineer), in order to compete in the recent handicap race for the Viceroy's Trophy. The machine finished fifth. A number of demonstrations were also made, and the mileage flown in two months totalled nearly 16,000.

CROYDON-COLOGNE, 312 *miles* (21/1/36).—Took off from Croydon at 07.22 hours. After a short stop at Lympne made direct for the French coast, where there were patches of sunshine. Ground-speed check gave 140 m.p.h., flying at 2,000ft. Great satisfaction.

Landed at Cologne just before a thunderstorm arrived; decided to stay, as weather too bad over hills to Frankfurt.

22/1/36: *Cologne-Vienna, 485 miles.*—Left Cologne at 08.50 hours with good visibility and clear in the zenith, but clouds ahead. G.S. check gave 120 m.p.h., but later dropped to 108 m.p.h. Air temperature, 0°C. Continental ground stations were very patient with our slow and somewhat bad operating, for we had not yet got used to flying the machine and operating at the same time.

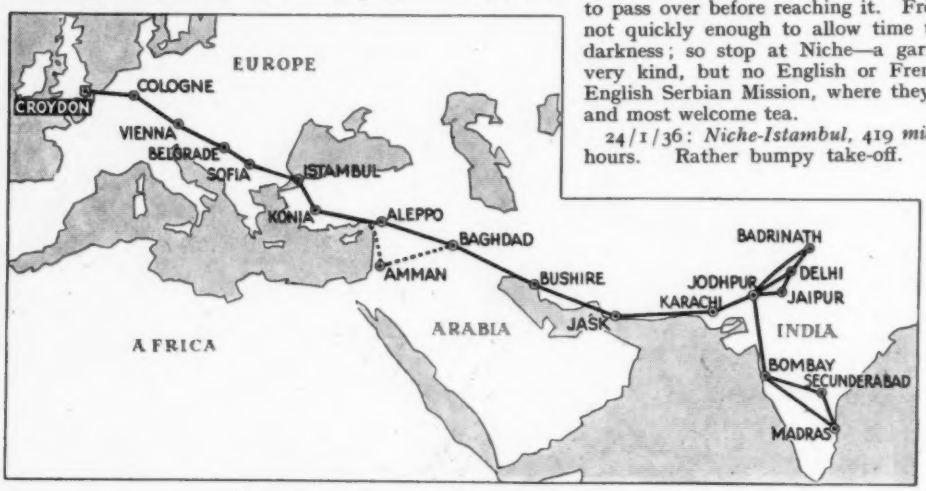
Raining hard at times, but clear in patches. Decided to stay under the murk, as we were not sufficiently skilled with the wireless to come in on bearings. Landed at Nurnberg, and stayed about an hour doing Customs and waiting for further met. reports to come through from Passau and Linz.

Left Nurnberg and Bradshawed through the valleys to Passau. Experienced slight carburetter freezing, which was easily cured by throttling back each engine in turn. Austrian Alps on the right very beautiful. Got in touch with Vienna, and found conditions O.K. Landed; surface poor.

23/1/36: *Vienna-Niche, 452 miles.*—Left Vienna 08.43 L.M.T. Arriving Belgrade, weather gets worse and rain starts. Had to make a turn soon after unsticking due to hill behind hangars at west end of aerodrome.

Rain becomes heavy, real cold-front type. Bradshaw up valley toward Niche, but have to wait about for front to pass over before reaching it. Front slowly passes, but not quickly enough to allow time to get to Sofia before darkness; so stop at Niche—a garrison town; everyone very kind, but no English or French spoken except at English Serbian Mission, where they gave us an excellent and most welcome tea.

24/1/36: *Niche-Istambul, 419 miles.*—Left Niche 07.42 hours. Rather bumpy take-off. Weather marvellous,



This sketch map indicates the route flown by the Scion. A diversion on the homeward route is shown dotted. Certain small detours have been omitted, as the scale would not be sufficiently large to show them clearly.

not a cloud to be seen. Stayed at Sofia one hour; large aerodrome, but somewhat rough. Left Sofia, avoiding prohibited area round town. G.S. 138 m.p.h. Wizard!

Crossed Turkish border prescribed height. Black Sea and Sea of Marmora visible. Had to go out to sea to avoid prohibited area. Moral effect of two engines very good.

Landed Istambul. Officials very polite, and no difficulties. Carried out 25 hours' schedule and general inspection on each engine. Everything O.K. Found that 25 hours' schedule took 3¼ hours, excluding plugs, as these were not touched.

25/1/36: *Istambul-Aleppo*, 698 *miles*.—Left Istambul 07.38 hours. Weather excellent. Greatly missed wireless, which had to be sealed over Turkey. Country not very nice for flying, distinctly mountainous, with snow on tops. Mt. Olympus, 70 miles to starboard, looks very impressive.

Stopped at Konia for fuel, resumed; climbed to 8,000ft. over mountains, sighted Mediterranean, and soon afterwards landed Adana. Left there after a short stop for Customs and climbed to 8,000ft. above the mountains behind Alexandretta, then down at a comfortable 120 m.p.h. to Aleppo. Landed on an excellent new runway, 1,000 yards×30 yards, and were told that we were the first machine to land on it, as the final rolling had only just been finished that morning.

Through the Near East

26/1/36: *Aleppo-Baghdad*, 480 *miles*.—Left Aleppo 08.36 hours after having filled emergency tank. Took off with an overload of 115 lb. in 10 sec. at 1,300ft. A good runway surface makes all the difference. Weather good, with a little cirrus. Euphrates soon in sight.

Landed at Baghdad; aerodrome large, but rough for our small wheels. Stayed a day to see town and carry out 25 hours' schedule; a few hours early, but it is the last chance before Karachi. Everything found O.K., with only a few adjustments necessary to clearances. Iraq officials very heplful and courteous.

28/1/36: *Baghdad-Bushire*, 534 *miles*.—Take-off good, considering long grass and bad surface. Ruins of Babylon seen on the right just before Basra. Country desert and uninteresting. Officials at Basra very efficient, and soon had us in the air again.

Anglo-Persian Refinery at Abbadan seen on the right, and soon afterwards one of their Rapides passed us in the opposite direction.

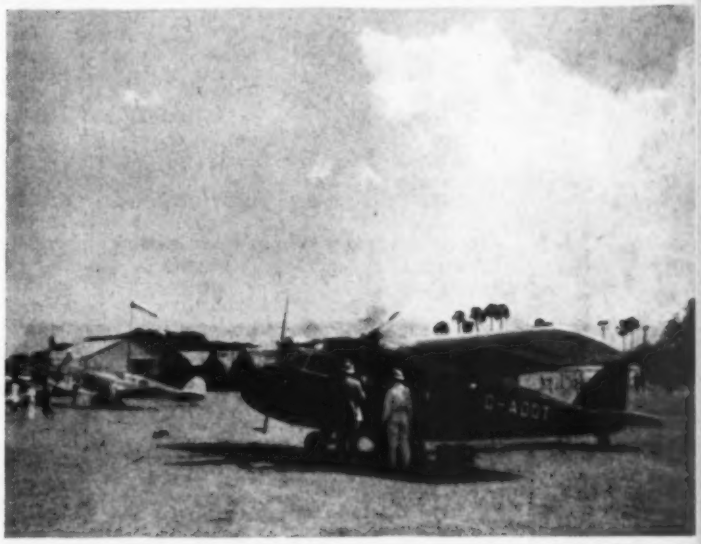
Followed the coast to Bushire and stayed at K.L.M. Guest House. Quite comfortable at this time of year.

29/1/36: *Bushire-Gwadar*, 866 *miles*.—Left Bushire 05.42 L.M.T. Soon after a refuelling stop at Lingeh we found that the port magneto was firing rather badly, so decided to go around the coast instead of across the bay. The trouble was found later to be due to a chafed H.T. lead, which was duly changed. Our first bit of bother. Landed Jask and had a little trouble with the Customs official, but, thanks to the Shell representative, things were smoothed over.

Jask to Gwadar was rather boring. At Gwadar, and put up at Imperial Airways' Rest House, where they were most courteous and friendly, but, before leaving, presented a most terrific bill for landing, attendance, and living and feeding, which, we were told, were their standard charges.

30/1/36: *Gwadar-Karachi*, 306 *miles*.—Left Gwadar 09.36 hours. Head winds all the way. At Karachi carried out 25 hours' schedule and check over airframe. Everything O.K.

1/2/36: *Karachi-Jodhpur*, 384 *miles*.—Left Karachi, and met head winds all the way to Jodhpur. Country largely desert, but not good landing, as it is very "wavy" and often covered with scrub, etc. Native huts seen quite frequently; impossible to imagine how they live, as there is practically no green vegetation. D/F. from Jodhpur came in useful. Aerodrome said to be the best in India. It is certainly marvellously equipped.



The top picture shows the Himalayas snapped from the Scion; the outstanding peak is Mt. Kamet (25,645ft.). The second shows the machine being refuelled at Bombay during the race. In the third is a sunny scene on Madras Aerodrome, while the bottom snapshot is of H.H. The Maharajah of Jodhpur trying out the Scion with his personal pilot, Flt. Lt. Godwin, at the controls.

Competing machines in the Viceroy's Cup Race lined up on the aerodrome at Bombay. The Scion is fifth in the line.

The State Hotel, which is almost on the aerodrome, is certainly a pleasure to stay at, which cannot be said of many Indian hotels. His Highness the Maharajah of Jodhpur, a great sportsman, owns two Tiger Moths, a Leopard, a Monospar, a Gull, and a Comper Swift, and flies them all himself. Godwin, his personal pilot and chief instructor, and Samuels, his chief engineer, gave us a warm welcome.

2/2/36: *Jodhpur-Delhi*, 304 *miles*.—Easy journey over arid desert country. Two salt pans, a railway, and some huts to check one's course. Supplemented these with a few bearings to give one something to do. When nearing Delhi at 6,000ft. saw the tops of the Himalayas 210 miles away.

Oil pressure tends to rise with warmer weather, an unusual but agreeable peculiarity.

5/2/36: *Delhi-Jaipur-Jodhpur*, 320 *miles*.—Left Delhi for Jaipur. A most picturesque spot. Upton, personal pilot to His Highness the Maharajah of Jaipur, showed us the sights, flew the Scion, and commented favourably upon its performance. Left for Jodhpur, arrived just before sunset.

7/2/36: *Jodhpur-Limbdi-Bombay*, 542 *miles*.—Left for Bombay. Flew over the Viceroy's Cup course to Ahmedabad. Country very hilly around Mount Abu, and not at all conducive to successful forced landings. His Highness the Maharajah of Limbdi is over seventy, but thoroughly enjoys flying.

Then on to Bombay via the coast, which is fertile with plenty of vegetation. Carried out 25-hour schedule ready for race.

A Line Squall Alarm

10/2/36: *Bombay-Secunderabad*, 422 *miles*.—Had to climb immediately to get over the Ghats, which go up to about 4,000ft. on the course to Hyderabad. Mountain scenery quite impressive around beautiful lake. Hyderabad and Secunderabad sighted, and soon afterwards the aerodrome. No hangars, so had to picket down. Stayed at the Secunderabad Club; most comfortable. Just after dinner large thunderstorm with accompanying line squall sprang up, so rushed out to aerodrome in taxi to hang on to 'plane. Got soaking wet to little purpose, as machine seemed quite firm.

12/2/36: *Secunderabad-Madras*, 315 *miles*.—Took off and saw very few landmarks for half an hour. Climbed steadily over wooded hills. Marvellous gorge in the middle, then down on to the plain with good flying country to Madras.

14/2/36: *Madras-Bombay*, 737 *miles*.—The Race. Ten starters. Ourselves off at 08.50 hours. Engines sounded very healthy. G.S. check shows 124.2, and a little later 126 m.p.h. against slight head wind.

Flew low, but after approximately one hour had to climb for hills. Mild rainstorm to starboard, afterwards reported as "terrific storm" in papers. Visibility excellent. Slowly down to Secunderabad for petrol and regulation 20 mins. stop. Run to Bombay rather uncomfortable, due to bumps. Bits of hay, leaves, etc., seen floating in convection currents at 2,000ft.

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15/2/36: Left at 09.40 L.M.T. G.S. check gave 118 m.p.h. Soon started out to sea across the bay. Wind getting strong again, so came down low; got rather bumpy. Motors still going marvellously well. G.S. check showed 121 m.p.h. Landed Ahmedabad, and off again in usual ten minutes. Petrol and other officials very efficient. Stayed low until hills, and altered course slightly to avoid Mount Abu. Dust devils all over the place between Abu and Jodhpur.

Landed Jodhpur. Run to Delhi uneventful. Passed one Moth and the west-bound Atalanta going in the opposite direction. Finished fifth at Delhi, the finish of the 1,500-mile course. Engines still continued to run wizardly.

Over Himalayan Foothills

Thanks to the hospitality of Pinhorn, of the Aero Club, and Tymms, the D.C.A., our short stay in Delhi was very agreeable.

Made an interesting flight to Badrinath under Mount Kamet. The foothills and valleys of the Himalayas are certainly tough flying country. Two engines most acceptable.

26/2/36: *Delhi-Jodhpur*, 304 *miles*.—Delhi to Jodhpur quite uneventful. Spent a lot of time dodging kite-hawks which we saw on the convection currents. An H.P.42 had hit one a few days before, with unfortunate results to the struts.

27/2/36: *Jodhpur-Karachi*, 384 *miles*.—Tried some photographs of passing kite-hawks. Flew low, passed a few stray camels, but they did not move an inch; truly marvellous nerves.

28/2/36: *Karachi-Jask*, 608 *miles*.—Left Karachi 07.50 L.M.T. Flew at about 1,000ft., due to head wind. Karachi gave upper winds for Gwadar and onwards, which showed head wind increasing. Seemingly wild camels wandering about below; large cumulus to port and small dust devils on the ground. Landed Gwadar and soon off again after paying normal £1 12s. 6d. landing and attendance fee! Followed coast to avoid sandstorm, which was very thick within a mile from the coast. Further G.S. showed 70 m.p.h., and, when approaching Jask, 65 m.p.h. Landed into 40 m.p.h. wind, and picketed down firmly to rings set in concrete.

29/2/36: *Jask-Baghdad*, 1,100 *miles*.—Left Jask 06.35 L.M.T., and thirty minutes later watched sun rise over mountains to starboard.

Stayed at Lingeh 1¼ hours, and then left for Bushire. Approached Bushire and landed. Everything seemed much greener than on the outward visit. Decided to make Baghdad direct, so filled emergency tank and hurried through Customs formalities. Took off slowly but reasonably well considering overload. Snow-covered mountains to starboard. Cut across bay and set course direct for Baghdad. Flat, marshy country with fairly good check, but supplemented these with W/T bearings from Basra and Baghdad to make doubly sure.

1/3/36: Landed Baghdad, having done 1,100 miles in exactly eleven flying hours—our best day's run.

2/3/36: *Baghdad-Khan-Zabib, 550 miles.*—Left Baghdad 12.27 L.M.T. Kept one or two early checks and some bearings to supplement them. The desert here is the real sand desert that one always reads about in novels, etc., and around Rutbah, the country gets higher and a little green vegetation appears. Made short stop at Rutbah, then set off for Amman. Our maps, we discovered afterwards, were out of date and did not mark the pipe line, so we relied on the old car route which went round in a gentle curve. Unfortunately missed track at one point and got rather far south of our course when sunset came, so informed Amman of our intention and landed by the side of the railway to wait for daylight and to ascertain our exact position. An uncomfortable but interesting night out.

R.A.F. Hospitality

3/3/36: Left just after sunrise and reached Amman in half an hour. The R.A.F. were very hospitable, and gave us a most welcome breakfast. Later went on to Ramleh after seeing Jericho, Jerusalem, Dead Sea and other historical spots. Changing country on each side of the mountains. Arid desert one side and "land flowing with milk and honey" t'other.

5/3/36: *Ramleh-Konia, 615 miles.*—Interesting flight along the Palestine and Syrian coast. Some very nice villas and bathing beaches, rather like a cleaner Riviera. Skating in the mountains at the back quite possible.

Motors doing their stuff in no mean style. Turkish mountains in sight. Cut across bay and landed Adana.

6/3/36: *Konia-Plovdiv, 600 miles.*—Do not recommend night stops at Konia. Beds reasonably comfortable, but food distinctly unusual. Arrived at aerodrome and found air temperature to be minus 10 deg. C., but after a little bother got engines started. and set off for Istanbul. Early G.S. checks showed 110 m.p.h., but later it rose to 135 m.p.h. Most satisfying, as we were all getting frozen to the core. Landed Istanbul amidst loud groans from the undercarriage, due to the terrible surface. Authorities stung us £5 for visas. After carefully inspecting aerodrome for the smoothest take-off run, got away without further financial damage. Heavy rain and low cloud made it impossible to get over the hills to Sofia, so landed at Plovdiv. Aerodrome rather wet and apt to be soft in winter.

7/3/36: *Plovdiv-Sofia, 96 miles.*—Take-off from Plovdiv delayed by fog, but got away at 11.30 after receiving a good met. report. Climbed above the inversion, and had a wonderful view of sun-topped mountains. Run to Sofia smooth and uneventful.

8/3/36: *Sofia-Belgrade, 206 miles.*—Left at 08.50 L.M.T. Weather not too good, doubtful if we would get through Dragoman Pass. Arrived there with clouds down on the top. Could not see through the gorge, so decided to turn back. Tried again in an hour's time and got through O.K.

10/3/36: *Belgrade-Vienna, 316 miles.*—Left Belgrade just before lunch and had comfortable flight, in good weather at first. Demonstrated machine to interested parties at Vienna.

11/3/36: *Vienna-Brunn, 68 miles.*—Waited some time for low cloud to clear. Saw the Danube for the last time and soon afterwards reached Brunn. Spent night with friends. Very pleasant.

12/3/36: *Brunn-Zlin-Brunn, 96 miles.*—Went over to Zlin to see Bata's boot factory. Marvellous organisation. Quite good aerodrome; excellent hangars and restaurant. Going over, had to Bradshaw in the valleys, but weather was clear for return trip.

13/3/36: *Brunn-Croydon, 786 miles.*—Left Brunn 10.20 L.M.T., and went up in cloud to sample ice formation. Seemed to form marvellously quickly on the props. Went above it and got some sunshine. Landed Prague and found weather just O.K. right through to Croydon.

Landed Cologne and were off in just under twenty minutes. After so much practice, we were usually able to get through Customs, petrol and met. reports quite quickly, the crew's jobs being arranged as follows: Engineer—re-fuelling; navigator—Customs, etc.; pilot—met. report.

The run on to Croydon was uneventful but pleasant, being generally at 3,000 feet in the sunshine over a layer of stratus. So ended two most pleasant and interesting months.

AN ANGLO-GERMAN VISITOR to CROYDON

The Heinkel He. 70a, which has been bought by Rolls Royce Ltd. as a flying engine test bed, photographed last week at Croydon. At present it is fitted with the 600/640 h.p. Kestrel V—already a standard unit in the R.A.F. Later this will give place to more "hush hush" types. The excellent form of the nose shows up to advantage in this picture.

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Thanks to the hospitality of Pinhorn, of the Aero Club, and Tymms, the D.C.A., our short stay in Delhi was very agreeable.

Made an interesting flight to Badrinath under Mount Kamet. The foothills and valleys of the Himalayas are certainly tough flying country. Two engines most acceptable.

26/2/36: *Delhi-Jodhpur, 304 miles.*—Delhi to Jodhpur quite uneventful. Spent a lot of time dodging kite-hawks which we saw on the convection currents. An H.P.42 had hit one a few days before, with unfortunate results to the struts.

27/2/36: *Jodhpur-Karachi, 384 miles.*—Tried some photographs of passing kite-hawks. Flew low, passed a few stray camels, but they did not move an inch; truly marvellous nerves.

28/2/36: *Karachi-Jask, 608 miles.*—Left Karachi 07.50 L.M.T. Flew at about 1,000ft., due to head wind. Karachi gave upper winds for Gwadar and onwards, which showed head wind increasing. Seemingly wild camels wandering about below; large cumulus to port and small dust devils on the ground. Landed Gwadar and soon off again after paying normal £1 12s. 6d. landing and attendance fee! Followed coast to avoid sandstorm, which was very thick within a mile from the coast. Further G.S. showed 70 m.p.h., and, when approaching Jask, 65 m.p.h. Landed into 40 m.p.h. wind, and picketed down firmly to rings set in concrete.

29/2/36: *Jask-Baghdad, 1,100 miles.*—Left Jask 06.15 L.M.T., and thirty minutes later watched sun rise over mountains to starboard.

Stayed at Lingeh 1¼ hours, and then left for Bushire. Approached Bushire and landed. Everything seemed much greener than on the outward visit. Decided to make Baghdad direct, so filled emergency tank and hurried through Customs formalities. Took off slowly but reasonably well considering overload. Snow-covered mountains to starboard. Cut across bay and set course direct for Baghdad. Flat, marshy country with fairly good check, but supplemented these with W/T bearings from Basra and Baghdad to make doubly sure.

1/3/36: Landed Baghdad, having done 1,100 miles in exactly eleven flying hours—our best day's run.

2/3/36: *Baghdad-Khan-Zabib, 550 miles.*—Left Baghdad 12.27 L.M.T. Kept one or two early checks and some bearings to supplement them. The desert here is the real sand desert that one always reads about in novels, etc., and around Rutbah, the country gets higher and a little green vegetation appears. Made short stop at Rutbah, then set off for Amman. Our maps, we discovered afterwards, were out of date and did not mark the pipe line, so we relied on the old car route which went round in a gentle curve. Unfortunately missed track at one point and got rather far south of our course when sunset came, so informed Amman of our intention and landed by the side of the railway to wait for daylight and to ascertain our exact position. An uncomfortable but interesting night out.

R.A.F. Hospitality

3/3/36: Left just after sunrise and reached Amman in half an hour. The R.A.F. were very hospitable, and gave us a most welcome breakfast. Later went on to Ramleh after seeing Jericho, Jerusalem, Dead Sea and other historical spots. Changing country on each side of the mountains. Arid desert one side and "land flowing with milk and honey" t'other.

5/3/36: *Ramleh-Konia, 615 miles.*—Interesting flight along the Palestine and Syrian coast. Some very nice villas and bathing beaches, rather like a cleaner Riviera. Skating in the mountains at the back quite possible.

Motors doing their stuff in no mean style. Turkish mountains in sight. Cut across bay and landed Adana.

6/3/36: *Konia-Plovdiv, 600 miles.*—Do not recommend night stops at Konia. Beds reasonably comfortable, but food distinctly unusual. Arrived at aerodrome and found air temperature to be minus 10 deg. C., but after a little bother got engines started, and set off for Istanbul. Early G.S. checks showed 110 m.p.h., but later it rose to 135 m.p.h. Most satisfying, as we were all getting frozen to the core. Landed Istanbul amidst loud groans from the undercarriage, due to the terrible surface. Authorities stung us £5 for visas. After carefully inspecting aerodrome for the smoothest take-off run, got away without further financial damage. Heavy rain and low cloud made it impossible to get over the hills to Sofia, so landed at Plovdiv. Aerodrome rather wet and apt to be soft in winter.

7/3/36: *Plovdiv-Sofia, 96 miles.*—Take-off from Plovdiv delayed by fog, but got away at 11.30 after receiving a good met. report. Climbed above the inversion, and had a wonderful view of sun-topped mountains. Run to Sofia smooth and uneventful.

8/3/36: *Sofia-Belgrade, 206 miles.*—Left at 08.50 L.M.T. Weather not too good, doubtful if we would get through Dragoman Pass. Arrived there with clouds down on the top. Could not see through the gorge, so decided to turn back. Tried again in an hour's time and got through O.K.

10/3/36: *Belgrade-Vienna, 316 miles.*—Left Belgrade just before lunch and had comfortable flight, in good weather at first. Demonstrated machine to interested parties at Vienna.

11/3/36: *Vienna-Brunn, 68 miles.*—Waited some time for low cloud to clear. Saw the Danube for the last time and soon afterwards reached Brunn. Spent night with friends. Very pleasant.

12/3/36: *Brunn-Zlin-Brunn, 96 miles.*—Went over to Zlin to see Bata's boot factory. Marvellous organisation. Quite good aerodrome; excellent hangars and restaurant. Going over, had to Bradshaw in the valleys, but weather was clear for return trip.

13/3/36: *Brunn-Croydon, 786 miles.*—Left Brunn 10.20 L.M.T., and went up in cloud to sample ice formation. Seemed to form marvellously quickly on the props. Went above it and got some sunshine. Landed Prague and found weather just O.K. right through to Croydon.

Landed Cologne and were off in just under twenty minutes. After so much practice, we were usually able to get through Customs, petrol and met. reports quite quickly, the crew's jobs being arranged as follows: Engineer—re-fuelling; navigator—Customs, etc.; pilot—met. report.

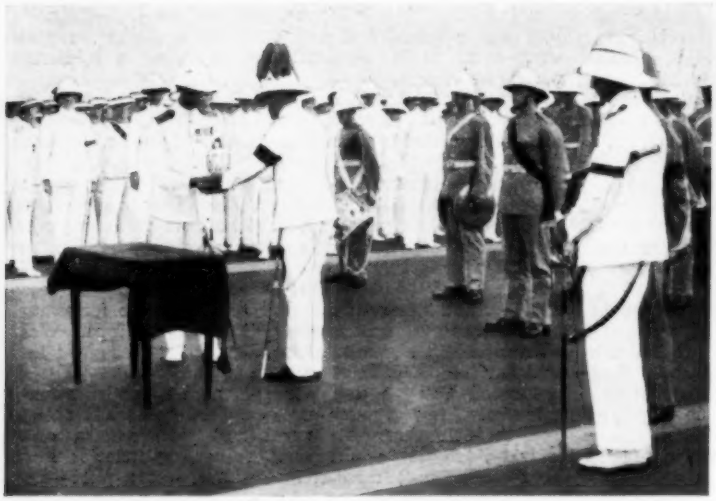
The run on to Croydon was uneventful but pleasant, being generally at 3,000 feet in the sunshine over a layer of stratus. So ended two most pleasant and interesting months.

AN ANGLO-GERMAN VISITOR to CROYDON

The Heinkel He. 70a, which has been bought by Rolls Royce Ltd. as a flying engine test bed, photographed last week at Croydon. At present it is fitted with the 600/640 h.p. Kestrel V—already a standard unit in the R.A.F. Later this will give place to more "hush hush" types. The excellent form of the nose shows up to advantage in this picture.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS



TWO WINNING TEAMS :—On the left, the Sassoon Bombing Trophy for units of the Far East and F.A.A. Squadrons in the China Station is being handed by Air Comdre. S. W. Smith to Capt. the Hon. G. Fraser, D.S.O., for the winning team, No. 824 Sqn., in H.M.S. *Hermes*. On the right is the team of No. 70 (B.T.) Sqn. which won the Sassoon Bombing Trophy in Iraq.

THE BRISTOL 142 BOMBER

The Air Ministry has bestowed the name Blenheim on the Bristol mid-wing medium bomber with two Mercury engines, which has hitherto been known by the number 142.

KING'S BIRTHDAY HOLIDAY

His Majesty has been pleased to approve a recommendation that during the present Reign the Saturday before Whit Sunday should continue to be the day fixed for the King's Birthday holiday in the Civil Service.

RECRUITING DEPOT CLOSED

The R.A.F. Recruiting Depot at 10, Pearl Buildings, Commercial Road, Portsmouth, was closed on March 20.

MORE NEW SQUADRONS

No. 64 (Fighter) Squadron formed at Henlow on March 1, 1936.

No. 218 (Bomber) Squadron formed at Upper Heyford on March 16. The unit is being equipped with the light bomber type of aircraft and has been placed under the command of the A.O.C.-in-C., Air Defence of Great Britain, in the Central Area.

BICESTER STATION

The R.A.F. Station, Bicester, together with No. 101 (Bomber) Squadron, will be transferred within the command of the A.O.C.-in-C., Air Defence of Great Britain, from the Central Area to the Western Area with effect from April 1. Works services will continue to be carried out by the Superintending Engineer, Central Area.

No. 60 SQUADRON REUNION

No. 60 Squadron, R.F.C., will hold a reunion dinner in London on April 25. Particulars are obtainable from Mr. A. Vivian, 2, Collingwood Avenue, Tolworth, Surrey.

ROYAL AIR FORCE DINNER CLUB

The annual dinner of the Royal Air Force Dinner Club which had been fixed for Friday, June 26, 1936, has been postponed until the winter. The date selected will be communicated to all members by circular letter in the early autumn.

VOLUNTEER AIR FORCE AT SINGAPORE

A Volunteer Air Force was inaugurated at Singapore on March 25, 1936. A number of officers and airmen of the Royal Air Force have already left England for Singapore to assist in the training of the Unit, and others will follow later in the year. The majority of the personnel of the Force, both for flying and for maintenance duties, will be recruited locally.

The first Unit of the Force will be primarily trained for co-operation with the fixed defences of the Base, and will be equipped with a type of aircraft similar to that used in the Royal Air Force for these duties. It will be, for the present, accommodated at the Air Force aerodrome at Singapore, but will move to the new civil aerodrome at Tanjong Rhu as soon as suitable buildings are available for it. The cost of these buildings is being defrayed by the generosity of the Sultan of Johore.

INTER-SERVICES RUGBY

The Army beat the R.A.F. last Saturday at Twickenham by three goals (one penalty) and a try, 16 points, to one goal, 5 points, and so became champion Service of the year. It was a scrambly and rather dull game, with occasional flashes of brilliance. The most brilliant movement was the run of F/O. G. A. Walker through the centre which ended in A/C. Holland picking up and worming his way most determinedly through a host to score the Air Force's only try. In the first half the experienced Army three-quarters were almost immobilised by the wildness of Dean's passes from the scrum; but their forwards kept the Army's end up by a number of brilliant loose rushes. In the second half Dean improved and then the Army piled on the scores. The R.A.F. defence was of the grabbing order, rather than clean low tackling, and their three-quarter line lacked sting. F/O. Ashton played a good game at full back. The R.A.F. gave away far too many free kicks, but only one produced a goal.

The R.A.F. team was:—F/O. P. W. Ashton (Hawkinge); Flt. Lt. K. B. Cross (Sealand), P/O. D. M. Strong (Grantham), F/O. J. B. Thompson (North Weald), and P/O. D. H. Craven (North Weald); F/O. G. A. Walker (Mildenhall) and P/O. J. L. Barker (Catterick); A/C.1 G. Greaves (Manston), L.A/C. W. V. Reynolds (Henlow); P/O. M. R. White (Cranwell), Flt. Lt. C. E. Beamish (Digby), Cpl. C. W. Sheppard (Grantham), L.A/C. W. Gascoigne (Uxbridge), F/O. T. N. Coslett (Henlow), and A/C.1 J. Holland (Hendon).

GORDON SHEPHARD MEMORIAL PRIZE ESSAY

The awards in the 1935 competition for the Gordon Shephard Memorial Prizes are shown below. The competition is open to all members of the Royal Air Force for essays on reconnaissance and kindred subjects.

1st Prize: Sqn. Ldr. R. S. Sorley, D.S.C., D.F.C., who is undergoing a course at the Imperial Defence College.

2nd Prize: Wing Cdr. R. H. M. S. Saundby, M.C., D.F.C., A.F.C., who is undergoing a course at the R.A.F. Staff College, Andover.

3rd Prize: Wing Cdr. R. L. Stevenson, M.B.E., Headquarters, Western Area, Andover.

R.A.F. BENEVOLENT FUND

The usual meeting of the Grants Committee of the above Fund was held at Iddesleigh House on Monday, March 23. Mr. W. S. Field was in the chair, and the other members present were: Mrs. L. M. K. Pratt Barlow, O.B.E., Air Comdre. B. C. H. Drew, C.M.G., C.B.E., Wing Cdr. A. S. Ellerton, O.B.E., and Air Vice-Marshal C. A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C. The Committee made grants to the amount of £357 0s. 4d. The next meeting was fixed for April 6.

FLYING ACCIDENT

The Air Ministry regrets to announce that Acting P/O. George Rowland Buchanan, of No. 10 Flying Training School, lost his life in an aircraft accident which occurred near Tern Hill on March 23. A.P/O. Buchanan was the pilot and sole occupant of the aircraft.

WOMEN'S ROYAL AIR FORCE RE-UNION

The thirteenth annual reunion dinner of the Women's Royal Air Force will be held at the Criterion Restaurant, Piccadilly, London, W.1, on April 4 at 6.45 for 7.15 p.m.

Dame Helen Gwynne Vaughan, G.B.E., will be in the chair and the guests will include Air Marshal Sir John Steel, K.C.B., K.B.E., C.M.G., Air Officer-Commanding-in-Chief, Air Defence of Great Britain; Air Vice Marshal Sir Philip Game, G.B.E., K.C.B., K.C.M.G., D.S.O., Commissioner of Police; Air Vice Marshal A. W. Iredell, Chief of the R.A.F. Medical Branch; and representatives of the Q.M.A.A.C., W.R.N.S., British Legion, Comrades of the Royal Air Forces Association, and other Ex-Service organisations.

It is hoped that there will be a good attendance.

Tickets, 6s. 6d. each, may be obtained from Mrs. G. S. Marshall, 47, Allington Road, N.W.4.

ROYAL AIR FORCE GAZETTE

London Gazette, March 24, 1936

General Duties Branch

The following are granted short-service commissions as Acting Pilot Officers on probation with effect from and with seniority of March 9:—I. M. Brodie, N. H. des C. Brouard, F. E. Burton, G. T. B. Clayton, D. T. Collins, D. L. Davies, P. J. F. Donnelly, J. M. Downton, G. Drew, F. P. H. Dufton, D. Ford, L. M. Gaunce, D. Genders, R. H. G. Grey, C. L. Olsson, D. Perry, T. G. F. Proctor, M. E. Reid, A. W. Ridler, J. F. Roulston, T. Rowland, J. W. C. Simpson, W. D. Sulis, J. L. Sullivan, J. H. Wedgwood, P. R. Woodward, P. J. Young.

Pilot Officer on probation J. Mercer is confirmed in rank (February 11); F/O. A. R. Collins is promoted to the rank of Flight Lieutenant (February 27).

The following Pilot Officers are promoted to the rank of Flying Officer on the dates stated:—R. A. I. Harrison (seniority May 28, 1935) (August 28, 1935); D. G. Stokes, R. J. Burrough (January 28); G. E. Jackson (March 1).

Sqn. Ldr. G. H. Hall, A.F.C., is placed on the retired list (March 19).

The short service commissions of the following Acting Pilot Officers on probation are terminated on cessation of duty:—F. J. Norris (March 12); E. Rosslyn-Stuart (March 14); J. H. Magnus (March 16).

Legal Branch

Flight Lieutenant on probation H. H. M. Shurlock is confirmed in rank (March 4).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

Sqn. Ldr. G. C. Rhodes (R.A.F., retired), is granted a commission as Flight Lieutenaant (Hon. Squadron Leader) in Class C (February 10); F/O. J. E. Clarke (R.A.F., retired), is granted a commission as Flight Lieutenant in Class C (February 5); L. O. Welch (Lt., R.A.S.C.O.) is granted a commission as Flying Officer in Class A (February 24); F/O. C. W. Halfhide is granted the honorary rank of Flight Lieutenant while serving with the Royal Air Force as a civilian technical officer (January 21).

The following are transferred from Class A to Class C:—F/O. (Hon. Flt. Lt.) A. M. Mitchell (February 20); F/O. J. W. Brown (March 25).

The following are transferred from Class C to Class A:—Flt. Lt. A. D. Bennett (June 24, 1935); F/O. L. E. B. Stonhill (February 3).

F/O. E. C. A. Wing relinquishes his commission on completion of service and is permitted to retain his rank (February 4); F/O. W. F. Jennings relinquishes his commission on completion of service (March 16).

SPECIAL RESERVE

General Duties Branch

F/O. T. N. C. Burrough relinquishes his commission on completion of service (January 28); the commission of Pilot Officer on probation A. R. Ross is terminated on cession of duty (February 6).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commander.—R. Young, to No. 1 School of Technical Training (Apprentices), Halton; for Administrative duties and to command No. 4 (Apprentices) Wing, vice Wing Cdr. H. H. MacL. Fraser, 16.3.36.

Flight Lieutenants.—E. F. Haylock, to Headquarters, Coastal Area, Lee-on-Solent, 27.1.36. O. R. Pigott, to D.D.R.M., Dept. of A.M.R.D., Air Ministry, 16.3.36. B. M. Cary, to No 218 (B) Squadron, Upper Heyford, 16.3.36.

Flying Officers.—R. V. Bucknall, to No. 2 Armament Training Camp, North Coates Fitties, 16.3.36. J. G. Davis, to No. 57 (B) Squadron, Upper Heyford, 16.3.36. W. I. G. Kerby, to Headquarters, R.A.F., Halton; on appointment to a permanent commission as Flying Officer (Assistant Provost Marshal) on probation, 6.3.36.

Pilot Officers.—J. C. Bevan, to No. 26 (Army Co-operation) Squadron, Catterick, 16.3.36. A. Foord-Kelcey, to No. 56 (F) Squadron, North Weald, 16.3.36. G. G. Cornwall, to No. 111 (F) Squadron, Northolt, 16.3.36. The undermentioned are posted to the Units shown on appointment to permanent commissions with effect from 3.3.36:—S. C. Elsworthy, to No. 15 (B) Squadron, Abingdon. P. D. Holder, R. H. Spencer, to No. 3 Flying Training School, Grantham. R. E. Baxter, J. H. Chaplin, P. J. Sanders, F. S. Stapleton, to No. 5 Flying Training School, Sealand. E. F. E. Barnard, to No. 32 (F) Squadron, Biggin Hill, 16.3.36.

Acting Pilot Officers.—A. J. Banham, J. Beavis, W. H. Cliff, P. M. J. Evans, N. G. C. Heath, C. P. V. Hervey, J. G. Kerby, S. H. Kernaghan, E. J. Little, T. N. Partridge, J. W. C. Powell, J. A. Richardson, G. R. Shepley, R. G. Taylor, J. A. Thomson, A. W. T. Traill, D. E. A. Williams, all to No. 11 Flying Training School, Wittering, 22.2.36. A. B. Olney, to No. 218 (B) Squadron, Upper Heyford, 16.3.36. G. L. C. Bagshaw, P. H. G. Beazley, P. E. Bennett, G. R. Boles, C. H. Bull, V. G. L. D. Burne, R. W. Denison, J. R. L. Edminson, L. F. Gregory, R. P. A. Harrison, L. R. Helps, W. A. Howell, G. V. Lane, F. R. Maguire, A. G. Malan, R. E. Mills, I. G. Morrison, D. A. Newell, E. Palmer, D. Parker, P. R. Patrick, G. W. Prior, J. W. B. Richardson, F. M. Smith, T. H. Stockdale, G. G. Storey, D. M. Strong, C. A. Turner, W. P. F. Treacy, H. A. A. Webster, and J. H. White, all to No. 3 Flying Training School, Grantham, 14.3.36.

Stores Branch

Flight Lieutenant.—G. Matthews, to R.A.F. Station, Hawkinge, 16.3.36.

Accountant Branch

Flying Officer.—H. E. J. Acfield, to R.A.F. Station, Northolt; on appointment to a permanent commission with effect from 16.3.36.

Commissioned Engineer Officers

Flying Officers.—The following are posted to the Units shown on appointment to permanent commissions as Flying Officers (Commissioned Engineer Officers) on probation with effect from 18.3.36:—W. H. King, to Reception Depot, West Drayton. A. J. Nicholas, to No. 1 School of Technical Training (Apprentices), Halton. A. C. Oatway, to Home Aircraft Depot, Henlow. J. K. Tough, to Headquarters, Inland Area, Stanmore.

Commissioned Signals Officer

Flying Officer.—F. W. G. Aggett, to R.A.F. Station, Aldergrove; on appointment to a permanent commission as Flying Officer (Commissioned Signals Officer) on probation with effect from 18.3.36.

Commissioned Armament Officers

Flying Officers.—The following are posted to the Units shown on appointment to permanent commissions as Flying Officers (Commissioned Armament Officers) on probation with effect from 18.3.36:—L. A. Bett, to Air Observers School, North Coates Fitties. A. J. Richardson, to Armament Training Camp, Leuchars.

Medical Branch

Wing Commander.—T. J. Thomas, to Headquarters, Fighting Area, Uxbridge; for duty as Principal Medical Officer, 19.3.36.

Dental Branch

Flight Lieutenant.—W. D. Guyler, to R.A.F. Record Office, Ruislip, 18.3.36.

Flying Officers.—I. St. C. Alderdice, O. F. Brown, J. H. G. Fensom, S. Hill, R. A. Pepper, W. A. H. Smith, to Medical Training Depot, Halton; on appointment to non-permanent commissions with effect from 9.3.36.

Private Flying

Topics of the Day

Easier Training

IT appears that there are still two completely different schools of thought in this matter of flying training. On the one hand there are the people who believe that pupils should be taught firmly and thoroughly on a fairly difficult aeroplane so that, thereafter, no other type will present much difficulty. On the other there are instructors who see no reason why pupils should be unnecessarily subjected to the chances of sudden death or be made to feel that the business of flying is one requiring the skill of a superman and an indifference to danger which is certainly not natural to mankind.

Generally speaking, the first attitude is the result of war mentality—product of a period when neither life nor cost was of any particular account. A pilot who had obtained his coveted "wings" was easily convinced that he was perfectly capable of flying anything fitted *with* wings, and unfortunate young men leapt out of the cockpits of Mono-Avros and into those of Camels—with a consequent increase in the War Office bill for telegrams of condolence.

"All Types"

THE second attitude is a natural product of peace and of the insurance companies. Since every pilot must, in any case, be checked up on a new type, the difference in flying qualities between the various machines is one of small moment. An hour or two of additional dual is neither here nor there.

When I proudly examined my "A" licence in 1929 I was particularly impressed by the statement that I was permitted to fly "all types." No power on earth, however, would have driven me into the sky with any aeroplane other than that on which I had been taught—and no sober instructor would have permitted me to do so, despite the fact that I had been trained on a type which it still considered to be one of the best from the point of view of fault-eradication.

A Concrete Case

NO pilot is immediately perfect on every machine, even after a good deal of experience of different types, and this fact was firmly brought home to me quite recently. After spending an hour and a half on a machine in which the pilot's seat is very far from the ground and on another machine fitted with a spring-loaded elevator, I did no flying for a week.

At the end of that period I had an opportunity of trying something quite different. During my first landing I held off too high and was positively ham-handed with the elevator, which was extremely light and effective right down to the stall.

Separately, the faults would have caused nothing much worse than a shaky landing, but together they resulted in an impact with the ground which was, in fact, quite the worst landing that I had done for years. Luckily, it was not so bad that anything was broken, but the most curious part of the whole thing was that I thought it was going to be a fairly good one until the considerable jar brought me firmly back to reality. Once the facts were understood the balance of my landings were quite good enough to pass unnoticed. The last was in the "demonstration" class.

The point is that if I hadn't been rash enough to come straight in for a landing after doing a few plain turns, and if I had practised "landings" at a safe height, I should have discovered all about this effective last-minute elevator control before it was too late.

Furthermore, if I had taken a good look round before opening up I should have realised that, even in the tail-down position, the pilot's level was still fairly low in relation to the ground—though the sensitive elevator was the main cause of the trouble. The motion of levelling off was made altogether too violently after a fairly steep glide. Once again, experience has been the best of all teachers.

Expert Opinion

AN instructor of very considerable experience once informed me, rather to my surprise, that no pilot, however experienced, was ever really safe with a new type, and that everyone should treat the business of flying a strange aeroplane with all the caution used by a test pilot.

It is a curious thing that once a pilot has become thoroughly accustomed to a machine he is often quite incapable of giving the newcomer any really useful hints and tips, for the simple reason that he has forgotten his early difficulties.

Quite recently a novice, who had been trained on a very safe and simple low-wing monoplane, asked me how a certain well-known training biplane handled, since he was about to take some dual therein. Because I had done about fifty hours on this particular machine, I simply couldn't tell him much about it. If the boot had been on the other leg I should have been able to give much more information. My hourage on the low-wing type came to the magnificent one of two, and I remembered all my reactions and minor difficulties with the greatest possible clarity.

The people who claim that any pilot can fly any machine are perfectly right in the narrowest sense, but the business of discovering all the idiosyncrasies of a strange aeroplane by oneself is a little hard on the nervous system. A quiet word of warning, too, can make all the difference to an initial approach and landing.

INDICATOR.

Private Flying

FROM the CLUBS

Events and Activity at the Clubs and Schools

LONDON

MR. F. V. MORELLO has made his first solo flight; Messrs. H. W. Boutwood, S. K. Reeves, E. A. Robinson, G. M. Tonge and G. V. Gibbins have obtained their "A" licences; and Mr. H. P. H. Martin has become a member. Last week's flying time was 90 hr. 25 min.

REDHILL

Blind-flying certificates have been issued to Messrs. Ellis Hill, Sargent and Kennedy. The Redhill Flying Club flew 59 hr. 40 min. last week.

BORDER

Strong south-easterly winds, bringing gusty and bumpy conditions near the ground, are keeping several members from going solo. New members are Messrs. G. Bowman and T. H. Little. A pilot who was forced to land to retrieve a map from the back seat of his machine was by no means enthusiastic when charged a landing fee.

PORTSMOUTH

The total flying time for last week was 32 hr. 45 min. Messrs. Hoult and Holmes have become members. Dual instruction is being given on an Airspeed Courier to candidates for the "B" licence. Mr. S. P. Reed is taking advantage of this at the moment. Club machines were busy on Friday when many members flew round the *Queen Mary*, which was lying off Cowes.

HERTS AND ESSEX

During the fortnight ending March 26, 143 hr. 55 min. flying was logged. Messrs. Pickford, McEwan Gibb, Reidy, Tring, Fletcher and Wherry became members, and Mr. Homi Chothia did his night flight. Messrs. Prowse, McLeod, Rendall and Chothia completed their blind-flying training, and Messrs. Catton, Bryant, Goldsmith, Atkins and Bakhtiar passed their "A" licence tests. There were twenty-one entries in the forced landing competition for the Alexander Clark Challenge Casket on Sunday, March 22. Mr. G. Sanders was the winner, with Messrs. Walters and Curtiss second and third.

READING

A dance was organised by the Phillips and Powis works last Friday in honour of "Tommy" Rose; about 700 people were there and the fun was fast and furious. A travelling case was presented to "Tommy" and a bouquet to Mrs. Rose. "Tommy" made an excellent speech and was enthusiastically cheered. Among those present were the Mayor and Mayoress of Reading, Mr. and Mrs. Bale, Mr. and Mrs. Charles Powis and Mr. and Mrs. Miles.

The same day marked the end of the term of the R.A.F. Reserve School. After a celebration dinner the pupils and some of the instructors joined the P. and P. dance. Other notable events of the week were the cocktail party given by Mr. and Mrs. Charles Powis at their house in honour of "Tommy" Rose and a luncheon for the Aston Martin private owners' club, which was held in the clubhouse. Messrs. R. Kessenich, a Swiss glider pilot, Victor Burnette and W. Riches have become members. Mr. Anderson has gone solo and Messrs. Flower and Halby have qualified for their "A" licences.

LIVERPOOL

Weather conditions last week were indifferent and the flying time was 49 hr. 25 min.

R.A.F.

The Royal Air Force Flying Club will be closed from Friday, March 10, until March 13 inclusive.

MADRAS

Miss Scrutton went solo during February and, with Mr. M. D. Sundararajan, passed all the tests for the "A" licence. The flying time for February was 208 hr. 15 min.

CAMBRIDGE

Charter trips were made to the Lincoln, to the Grand National, and to Bournemouth last week. Mr. Peacock completed his "A" licence. The flying total was forty-four hours.

BENGAL

The flying returns for February were 21 hr. 35 min. dual and 49 hr. 35 min. solo. Messrs. Catto and Gadgil started taking dual instruction during the month, and Dr. P. Pickenbrock passed all the tests for his "A" licence.

C.A.S.C.

Members flew 5 hr. 50 min. dual and 1 hr. 35 min. solo during the week-end before last.

A formation flight to Hatfield was postponed last week end because of weather. Members flew 6 hr. 30 min. at Fen Ditton last week.

BRISTOL

The following have become members: Miss B. Brown, Miss B. Gardner, Messrs. R. Dyer, J. B. Hunt, C. D. Linton, R. Clare and B. A. Maggs. Mr. S. Appleby demonstrated the Pou-du-Ciel on March 28. In the capable hands of Mr. Appleby the Pou was made to perform like an aeroplane.

MIDLAND

Tests for the "A" licence have been passed by Messrs. G. E. P. Thorneycroft and H. C. Bartholomew. Mr. P. R. Burton has gone solo. For the week ending March 27 flying times were 20 hr. 5 min. dual and 9 hr. 45 min. solo. The Club's annual dance will be held on Friday, November 27, at the Botanical Gardens, Edgbaston.

HANWORTH

First solos have been made by Messrs. L. Hanney, J. E. M. Williams, and G. Toth. Messrs. C. B. J. Porter, S. E. Tillman and G. Delauney have become members. Mr. P. C. Lawton, who has been receiving tuition under the auspices of the National League of Airmen, has taken his "A" licence. Last week's flying time was 55 hr. 40 min.

TOLLERTON

For the week ending March 26 Tollerton's flying time was thirty-three hours. Mr. J. G. Browne and Mr. D. H. Pyatt joined the Club as flying and associate members respectively. Mr. Peter Clifford qualified for his instructor's licence. About 120 members attended the last dance of the season held in the clubhouse.

SIMPLIFIED FLYING: Another interesting American result of Mr. Vidal's compaign for simpler aeroplanes—the Campbell all-metal pusher monoplane which, with a Ford V8 engine, has a cruising speed of 100 m.p.h. As in the case of the Weick and the Hammond, the machine has a three-wheeled undercarriage, and that there is a very good field of view in the "two place" cabin can be gathered from this Shell Aviation photograph. Note the radiator intake.

Private Flying

THE GIRL OF THE LIMBERLOST : The first photograph of a D.H. Hornet Moth on skis. It was taken at Limberlost, a popular winter sports resort north of Toronto, and with the machine is Mrs. Lee Murray, wife of Mr. Lee Murray, who manages the Canadian De Havilland Company.

SOUTH COAST

The poor weather on Saturday and Sunday did not prevent a total of twenty-one hours' flying being reached last week. Miss Grant passed the tests for her "A" licence. New members were Mr. and Mrs. Gilding, Mrs. Frost, and Mr. Dunning.

BROOKLANDS

Twenty-five hours of club flying on Saturday made another record day for 1936, whilst bookings for Sunday would have created another if the weather had not failed once again. The ornamental lakes have gone from Brooklands, but half the aerodrome has now been turned into ridge and furrow and looks as if potatoes were being planted! However, this is a start of the En Tout Cas' efforts to level the surface.

New members were Messrs. R. Callingham, R. A. C. Sumner, and T. B. Boughton. Mr. L. Clemens, of Sweden, has completed his first solo, whilst Mr. Gardner finished the tests for his "A" licence.

Mr. R. Ashton is starting a new series of classes for the 2nd Class Navigators' certificate on April 6. Members and others wishing to sit for this examination in July or October should apply now. The monthly landing competition was won by Dr. Whitehurst. Mr. Vokes was second and Mr. Machin third.

SOUTHEND

Despite three days of bad weather, the hours flown during the week ending March 29 totalled nearly twenty-two. Mr. Crighton and Mr. Stanley Waters passed the tests for their "A" licences and Mr. Storey flew a first solo on Sunday.

CINQUE PORTS

Mr. and Mrs. Davis, together with a number of club members, flew to Speke on Friday to see the Grand National. The Club, not possessing an aeroplane large enough to accommodate all the racing enthusiasts, chartered a Rapide from Olley Air Service. Mr. Bill Ledlie was the pilot and the C.P.F.C.'s chief steward, Mr. Warner, was among the passengers.

The Club has accepted the agency of the Aeronca for Kent, Sussex and Surrey. Mr. Wakefield arrived on Saturday in his new B.A. Eagle which he recently purchased through the Club. Yet another member from the R.A.F., Mr. E. S. Draper, who will shortly be leaving the Service, has completed a course of instrument flying with the Club preparatory to his taking a "B" licence.

Organised Air Cruising

IN December *Flight* announced the air cruise which has been organised for owners of Miles Hawk and Miles Falcon aircraft by Autocheques in conjunction with Phillips and Powis Aircraft.

A brochure giving full details of the programme and costs, which, incidentally, are inclusive and as low as £26 15s. per person, has now been produced, and a copy may be obtained by applying to Autocheques, Ltd., at 33, Regent Street, London, S.W.1, or to the new branch office at 111, New Street, Birmingham.

Seeing the American Factories

TWO comprehensive tours are being organised this year by the American Express Company for the benefit of aeronautical engineers and others who are interested in American manufacturing methods. Arrangements have been made whereby visits to nearly all the best-known aircraft factories can be made. The approximate cost of Tour No. 1 are £147 (to travel cabin class on the steamers) and £102 (tourist class). Those for Tour No. 2 will be about £230 and £195 respectively, and inclusive.

Although these tours have been designed primarily for French engineers, and in conjunction with the Cie Generale Transatlantique, this fact should make them all the more interesting from our point of view since a triangular exchange of ideas will be possible. Both tours will cover the month of July, and further information can be obtained from the American Express Company at 6, Haymarket, S.W.1.

INDIA'S MODEL AIRPORT BUILDING : This aerial picture, taken by Indian Air Survey and Transport, clearly shows the design of the New Delhi airport building, which was opened by H.E. Lord Willingdon on February 15. It is particularly interesting since it will be the model for several others which are to be built in India and forms a concrete result of the travels of Mr. R. T. Russel and Capt. A. G. Wyatt, who were responsible for the design.

KING'S CUP REGULATIONS

Details of the Eliminating Course : No Sea Crossing This Year

REGULATIONS for this year's King's Cup Air Race, which takes place on Friday and Saturday, July 10 and 11, have now been published, and are obtainable from the Royal Aero Club.

The chief alterations, as compared with last year, concern the division of competing machines into three classes—as discussed on page 299 of *Flight* on March 19—and the use of an eliminating course which involves no sea crossings and lies entirely in the southern half of England.

The chief award, of course, is the cup presented by His Majesty the King, while Lord Wakefield will present prizes of £500, £200 and £100 to the competitors who are first, second and third respectively. There will also be awards for other competitors qualifying for the final.

Principal points from the regulations are as follows:—

The entrant, the pilot or pilots and any passenger carried in the race must be British subjects. The entrant must be an individual and not a firm or company. The pilots must have had at least 100 hours' experience of solo flying prior to the start, and must be prepared to produce evidence to this effect.

Any type of *bona fide* civil aircraft is eligible provided that, including the engine and the accessories, it has been entirely constructed in the British Empire. For the purpose of this rule a *bona fide* civil aircraft shall be deemed to be one which was originally designed and subsequently constructed for use in civil aviation activities.

The eliminating contest takes place on the Friday, July 10; it will start at 8 a.m., and the order of starting will be announced later. The course will be as follows, and two circuits will be flown, making a distance of approximately 1,224 miles:—

		Miles.
HATFIELD	Start.	
NORWICH (Mousehold Aerodrome) ...	Turning Point ...	91
NOTTINGHAM (Tollerton Aerodrome) ...	Turning Point ...	103
BRISTOL (Whitchurch Aerodrome) ...	Control	121
SALISBURY (High Post Aerodrome) ...	Turning Point ...	40
SHOREHAM (Municipal Aerodrome) ...	Control	69
COVENTRY (Anstey Aerodrome) ...	Turning Point ...	120
HATFIELD	Control at end of first circuit	68
Approximately		612 miles

For the purpose of the eliminating contest competing machines will be divided into three classes:—

(A) Those the total engine power of which does not exceed 150 b.h.p. at maximum permissible r.p.m.

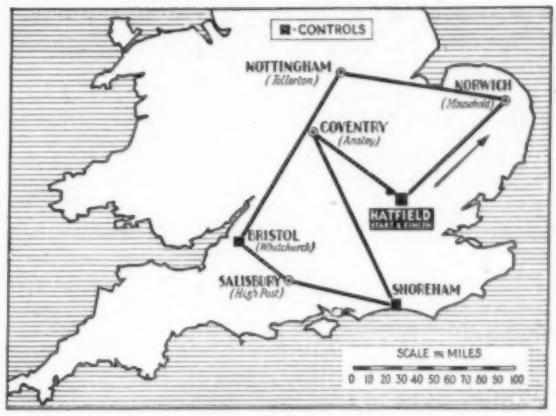
(B) Those exceeding this power.

(C) Multi-engined aircraft with no restriction as to power.

Multi-engined aircraft are not confined to Class C, and may be entered in either Class A or Class B according to their horse-power.

All time spent on the ground, whether at official control points or elsewhere, will count as flying time.

Subject to the following provisos, 50 per cent of the starters in each of the three classes (counting the half as one if necessary), with a maximum of ten in each class, which complete the eliminating course in the least time, will pass into the final, no handicap allowances being given for the eliminating contest. Any aircraft which fails to complete the course within twelve hours from its official starting time will not qualify for the final, notwithstanding the fact that it may be among the 50 per cent. above referred to. The organisers reserve the right to modify this rule in the event of weather conditions rendering it impossible to complete the course within twelve hours.



The course for the eliminating race.

The course for the final will consist of a number of laps of a circuit of not less than 50 miles with an approximate total length of 350 miles, starting and finishing at Hatfield Aerodrome. Particulars of the course will be issued later.

Machines which have qualified will race on estimated performance handicaps, issued prior to the start of the first day's race, as in previous years. There will be no adjustment of handicap allowances between the eliminating contest and the final. For the purpose of the handicap in the final the minimum handicap speed will be 130 m.p.h.

Competing machines must be at Hatfield Aerodrome, completely erected, for verification by the officials not later than 12 noon on Thursday, July 9.

The entry fee is £10, and must be paid to the Royal Aero Club, 119, Piccadilly, London, W.1, not later than 5 p.m. on May 18. Late entries at double fees will be received up to 5 p.m. on May 30.

The entry form complete with all particulars must be received by the Club not later than 5 p.m. on May 30.

New Aviation Investment Trust

UNDER the title of Aviation and Universal Investment Trust, a new flexible trust of the managed unit type, which will spread its funds over securities of leading companies in a wide range of industries likely to benefit from expansion in aviation, has been formed.

The new trust will be managed by Aviation Trust Managers, Limited, a company formed by a group representing important City interests. The Chairman of the management company is Lord Sempill.

The trustees for unit-holders in the new trust will be the General Accident, Fire and Life Assurance Corpn., Ltd.

"Pou" Parts and Prices

SOME interesting details regarding prices of *Pou-du-Ciel* parts is given in a leaflet issued by Aircraft Constructions, Ltd., of Sidcup, Kent. By way of example may be quoted the following: Main wing, with tanks, covered, stitched, doped and finished in any colour, £29 10s.; rear wing complete, £19 10s.; fuselage, £24; rudder, £4 4s.; main spar, £3 15s.; set of ribs for main and rear wings, ready for assembly, £6 15s.; airscrews, laminated walnut or mahogany, £6 6s.; tanks, with gauges, etc., per pair £3 3s.; tail wheel, 10s.

The list appears to cover every item that the most ardent *Pou* constructor could possibly need, and also contains details of two types of power unit, the British Anzani and the Douglas

Publishers' Announcement

EASTER HOLIDAYS

Miscellaneous Advertisements intended for the issue of April 9 must be in our hands by first post on Monday, April 6.

The attention of readers is also directed to the fact that next week's issue, dated April 9, will be on sale on Wednesday, a day earlier than usual.

FLIGHT PUBLISHING CO., LTD.

COMMERCIAL AVIATION

AIRLINES — AIRPORTS

ECONOMICAL TRANSPORT: A pleasant impression of one of the new Percival Vega Gulls above the clouds. With a Gipsy Six engine, this machine carries three passengers, in addition to the pilot, at a cruising speed of 150 m.p.h., and should prove popular for feeder line and charter work as well as for private ownership. A detailed description of the machine appeared in *Flight* of January 2.

THE WEEK AT CROYDON

An Anglo-German Arrival : Special Charters : A New Venture : Rome Express and Others : Roof Departures

LAST week's main event, perhaps, was the arrival on Friday of a bolt from the blue in the very shapely shape of a Heinkel He 70 with a Rolls-Royce Kestrel V, with which engine it has even cleaner lines than before. The pilot was Herr Cuno, and, later the same day, the machine was flown to Hucknall, Nottingham.

The flight was made *via* Amsterdam, and Amsterdam-London was covered in 1 hr. 19 min. Some cynic said that, as there seemed to be a passionate desire for someone to make some sort of gesture, it would be a good thing if M. Flandin bought one of these Anglo-German aeroplanes and dashed to and fro between Paris and London in it, dropping in en route at Brussels for M. van Zeeland.

Talking of dashing about by air, Herr von Ribbentrop is still piling up aerial miles between Berlin and London, and one of the most interesting cargoes carried last week was about half a ton of teleprinter apparatus from Berlin by D.L.H. for the German Embassy in London, to be used for direct communication with Berlin during the present negotiations.

Capt. Olley had a special charter last week to Cannes when his passengers were Mr. and Mrs. Samuel Goldwyn and Mr. Goldwyn, Jnr. He left after lunch one day and started back at 5 a.m. the following morning, so that he was in his office shortly after 9 a.m.—thus saving a business day. Special charter work is starting to come in thick and fast, and, of course, there was a great rush to the Grand National as well as to the *Queen Mary* at Southampton, the main hall being filled with hard-bitten gentry in check overcoats and bowler hats with little buttons let into the back of the brim—people with those brick-red complexions caused by an open-air life (perhaps). There was a certain wistfulness in the eyes of airport people when several cases of champagne were seen loaded into one of the "race specials," but most people were too busy to brood. The weather was far from good, and there must have been something like fifteen machines in the air at the same time between Liverpool and Croydon. Everything went smoothly, thanks to excellent work on the part of Belfast and Manchester D/F stations.

In the Rollason shops, amongst a number of interesting craft which have already been mentioned in *Flight*, there is a D.H.86 ready for delivery to Personal Airways, Ltd., of which Capt. Bill Ledlie is the great white chief. This, it is understood, will be a special charter business run on those personal lines which appeal to wealthy and influential people, and "Bill" has the good wishes of everyone at Croydon for his new venture.

Amongst interesting new services scheduled for the summer season is the "Rome Air Rapide," to be operated by K.L.M. in conjunction with D.L.H. and A.L.I. (Avio Linee Italiane). Leaving Croydon at 7 a.m. and running *via* Amsterdam, Cologne, Frankfurt and Milan, Rome is reached at 4.40 p.m., whilst in the other direction one may

leave Rome at 10.25 a.m. and arrive at Croydon at 8.35 p.m. Next summer, too, there will be three services daily between London and Berlin *via* Amsterdam, and after July 1 the Scandinavian Air Express, run by K.L.M.-A.B.A., will continue to Stockholm.

There is also the "Blue Danube Air Express" (K.L.M.-C.L.S.) from London, *via* Amsterdam, to Prague in five hours, then Vienna (6 hr.) and Budapest (7½ hr.), which will be operated throughout by Fokker-Douglas machines. It appears to me to be a pleasant habit of K.L.M. and co-operating companies to name these services so romantically. The very name "Blue Danube Air Express" is enough to bring a rush of passengers, despite the fact that the Danube is actually yellow in colour.

We are not without quaint incidents to enliven otherwise dull lives. Last week a lady passenger of Imperial Airways went missing and after much frenzied dashing to and fro, she was found on the roof of the main building, where, she remarked, she was waiting for the plane, which, she supposed, started from there. That sort of thing comes from reading the newspapers. In the eighteenth century they put down many of their troubles, including the Mutiny of the Nore and various agrarian riots to the fact that the "lower classes" could read. Incidentally, the upper wing of a Heracles is only six feet or so below the level of the flat roof of the main building at Croydon, so the time may come when people will embark over a gangway from the roof and along a cat-walk on the wing and then down a companion-way to the cabins.

Last Sunday the D.L.H. Croydon people, led by Mr. Schmidt-Rex, boarded a special Ju.52 and flew to Germany to vote, and another special D.L.H. machine carried the staff of the German embassy to Cologne for the same purpose. They do these things well in Germany. The best I ever do at election times is to get a lift from my house to the polling booth in an ancient automobile driven by a worried woman volunteer who is too interesed in party politics to pay attention to traffic problems. But then, of course, I don't have to vote if I don't want to

A. VIATOR.

Bournemouth's Plans

ALTHOUGH an aerodrome is already in use at Christchurch under the management of Mr. F. E. Fisher, the Bournemouth and Poole Corporations are asking for permission to borrow a large sum for the purchase of land suitable for use as an airport serving the two boroughs. The proposed site is within the northern boundary of Poole.

Imperial Nomenclature

IT has already been announced that the names of the twenty-eight new flying boats for Imperial Airways will begin with the letter "C." The letters "A" and "B" are, of course, needed for the present fleet, and "D" is reserved for the D.H.86 machines. The twelve Armstrong-Whitworth monoplanes will have names starting with "E," and the letter "M" has been allocated to the Mayo composite machines which will be known as Maia and Mercury—the former, appropriately enough, was the mother of the latter. Let us hope that the child learns to walk without difficulty!

The L.Z.129 in Service

ON March 23 the new Zeppelin made its first passenger flight from Friedrichshafen. After cruising for an hour or more over Constance the *Hindenburg* followed the Rhine and landed, with her fifty passengers, after cruising for more than six hours. Capt. Lehmann was in charge.

Three days later, while starting for a four-day cruise, the L.Z.129 was slightly damaged by a gust of wind after the ship had left her shed. The flight was continued for a few hours and the ship was then landed for minor repairs before making a new start on the tour.

According to a provisional time-table, ten return flights will be made to Lakehurst, N.J., during the summer, the first being scheduled, as already announced, to leave Frankfurt on May 5/6.

A Faster Golden Clipper

ONE of Air France's Wibault Golden Clippers has been fitted with a retractable undercarriage. The work has been going on for some time and now the finished job has been flown from Le Bourget to Villacoublay, where it is undergoing thorough flying tests.

The gain in speed is said to be in the region of 12 m.p.h., which will bring the cruising speed up to 157 m.p.h. without any increase of weight.

Two Mysteries

IT appears to be unlikely that even the report of the official investigation will clear up the mystery of the tragic accident to a Commercial Air Hire Dragon last week. The machine was engaged in co-operation with searchlight and A.A. units at the time, and would, in these circumstances, be flying at about 8,000 ft. while in the Portsmouth area.

As usual, the evidence is somewhat contradictory. At least one other pilot, Mr. Woods, of Surrey Flying Services, who was engaged in the same work, reported severe static manifestations, and returned to Croydon. The state of the wreckage suggests that the machine dived into the ground, but a witness apparently stated that it was flying fairly normally a moment before the impact.

Mr. F. J. Birmingham, the pilot, was previously employed by Imperial Airways, and Mr. R. F. Burgess, the radio operator, was very well known at Croydon.

On the same day a Ford Trimotor, carrying ten passengers, a crew of three, and a technical expert, crashed near Mexico City with the loss of all lives. The machine had been specially chartered under a Hamburg-Amerika world tour, and was on its way to Guatemala. Although the operator had been in communication with another machine, the trailing aerial had, it is stated, been wound in—a fact which suggests that a landing was expected.

THE ROLLS-HEINKEL: Another view—the first is on p. 355—of the He 70 a, with Kestrel V engine, which visited Croydon last week on its way to Hucknall from Germany.

Commercial Aviation

LONG-DISTANCE RADIO

Marconi Equipment for the Empire Fleet : Engine-driven Generators, Retractable Aerials and Separate Emergency Power Supply

ALL the experience gained during the past fifteen years will be incorporated in the special wireless equipment which is being developed by the Marconi Company for use in the new Empire fleet of Short flying boats. Although only well-tried features appear in the installation, this is of special interest since the boats will, for the first time, be flying regularly by night as well as by day at higher speeds than have previously been used, and will, of course, be operating in parts of the world where ground stations are few and far between.

In brief, the new installation will allow the machines to fly when necessary as self-contained units, independently of specialised radio stations, and has been designed so that no possible emergency will leave a machine without the very necessary contact with civilisation.

In addition to transmitting and receiving sets operating on both long and short waves, a direction-finder has been incorporated and power can be supplied, while the engines are out of action, by means of a small auxiliary petrol motor which is part of the generating system. The wavelengths are from 16-75 metres and from 600-2,000 metres, and the direction-finding equipment is incorporated with the normal receiver. As this will not be in constant use, the loop aerial is so mounted that it can be retracted into the hull. The fixed aerial, too, is adjustable so that three feet of additional aerial is available when necessary.

When in normal flight the fairlead for the trailing aerial extends some two feet through the bottom of the hull and, before alighting and after the aerial has been wound in, this fairlead is drawn up through a spring trapdoor which is sealed by a rubber joint.

In the layout of the Empire boats, the wireless operator's compartment is immediately behind the control cabin, and care has been taken to ensure that the lighting of the tuning and other dials, though adequate for night operation, shall not be such as to cause awkward reflections on the pilot's instruments or windscreen. When the direction-finder is being used for homing and the loop aerial is fixed athwartships the pilot himself can listen in to the varying signals. The Marconi Company has, incidentally, developed a visual homing indicator which is remarkably steady in operation and is graduated so as to give the pilot an approximate idea of the number of degrees "off-course."

Most interesting of all the equipment, however, is that arranged for the power supply. Two of the Bristol engines are fitted with single-output generators which charge a 24-volt battery. A motor drives a special double-output generator for the radio equipment. When the machine is on the water and the battery charge must be conserved, a small two-stroke engine, mounted in unit with the motor and the radio generator, can be coupled up to the driving shaft. The motor is then momentarily used to start this engine and afterwards becomes, so to speak, a mere driving shaft; if the battery is badly "down," of course, the little engine can be started by hand and the motor can become a dynamo for the purpose of restoring the battery to normal.

This little engine is fan-cooled and is designed to work at 3,500 r.p.m., which is the normal speed of the generator. Full-load tests have been made with the engine and there have been no signs of overheating over long periods of operation. So far as the interior of the hull is concerned, the engine lies in a gas-proof box, but can be dismantled very quickly and easily in case of trouble.

Normally, radio equipment is mounted on rubber cord in order to damp out all shocks, but for this Empire equipment special supports are used. These consist of brackets composed of rubber bonded to steel by a method developed by the Firestone Company. The complete installation—apart, of course, from the engine generators and the battery, which supplies all the lighting and power needs of the ship—weighs exactly 235lb.

The Hackbridge Works

The Marconi organisation at Hackbridge, Surrey, has been created quite recently for the sole purpose of developing aircraft and complementary equipment, and Mr. J. M. Furnival, who has had many years of aircraft radio experience, is in charge of a picked group of skilled men. Only after the various items of equipment have reached the production stage are they turned over to the Chelmsford factory.

At the Hackbridge works can be seen the latest developments in short-wave approach beacon transmitters with which the company has been experimenting for a number of years. Another company is also working on these lines, and it would appear that eventually, when the Airport of London is equipped for blind approaches, many of the minor difficulties which have been experienced with the Lorenz beams will have been overcome.

Contrary to popular opinion, the system which was the first to be developed on a commercial basis does not always give the results which might be expected. Furthermore, the battle between aircraft and television interests is by no means over, and it may yet be necessary to use wavelengths other than those at present standardised for short-wave approach work.

The Cape Terminus

IMPERIAL AIRWAYS' African service is now terminating at Johannesburg and South African Airways will, in future, carry all mails and passengers over the balance of the route. This arrangement, of course, is a prelude to the plans whereby S.A.A. will handle all internal air traffic in South Africa while the Imperial boat service will use Durban as a terminus.

The New Standard

ONE of the pilots of Imperial Airways, Capt. G. L. Powell, has recently received a Master Pilot's certificate endorsed for both land and marine types. Since 1930 he has been flying both Hannibals and Scipios, and has now put in enough night and day flying of these types to be the first to have a Master Pilot's ticket endorsed for both.

The Lisbon Service

FOR some time it has been known in air transport circles that British Airways have more than a passing interest in Mr. Leo Crilly's company. During the past few weeks the Fokker F.12s, which were purchased by Crilly Airways for their Lisbon service, have been used on the B.A. Paris service from Heston.

A new company representing both interests has now been formed under the title of British Airways Iberia, Ltd., with Mr. Crilly as managing director. It is understood that the Portuguese mail contract has been transferred to this new company.

Italy's Land-and-sea Airport

THE laying-out of an airport capable of being used by flying-boats as well as aeroplanes—stated to be the largest in Europe—is now being feverishly carried on at Linate, near Milan. A colossal hangar capable of housing over four hundred machines is also being built.

As in the case of Gatwick, a railway station will be built by this airport, and frequent electric trains will link the station with the rest of the Italian railway system. Signor Mussolini has ordered this airport to be ready by next October, and more than two thousand men are working at full pressure.

Greater Tempelhof

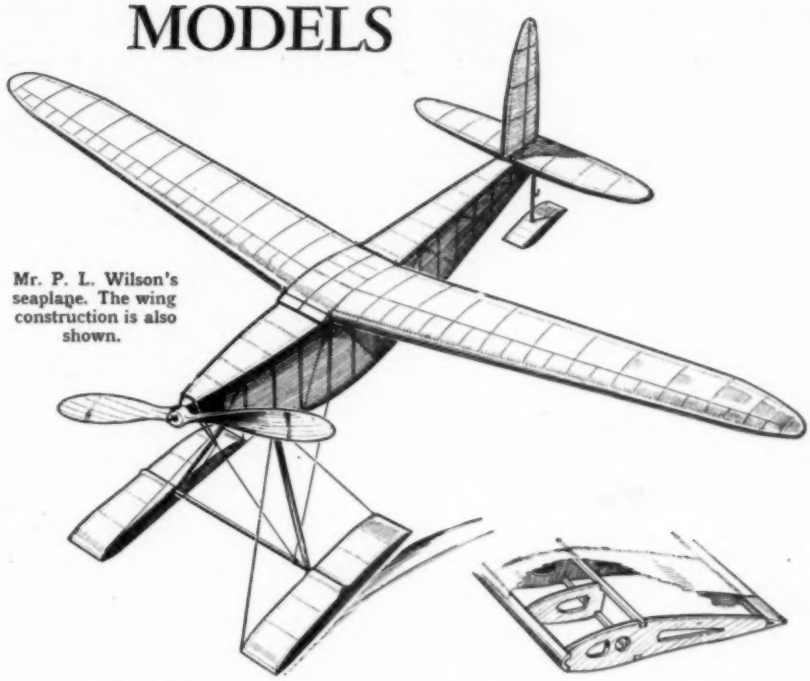
NOT satisfied with the fact that Berlin's present airport on the Tempelhoferfeld, which was laid out in 1921, is one of the largest and most centrally situated in Europe, the Nazi regime plans to increase its size, and work has already been started.

In its final form Tempelhof will be of oval shape, with runways of a mile to a mile and a half, and fifteen new hangars are being erected, as well as new covered "platforms" for the incoming and outgoing passengers. Visitors to this airport will no doubt remember that a number of machines are regularly parked in the open during both winter and summer. The Chancellor uses his private Ju.52 for many journeys, and this fact has doubtless had a good deal to do with the advancement of the scheme.

MODELS

Ultra-lightness Exemplified in a Seaplane : Some Important Flying Meetings

By M. R. KNIGHT



Mr. P. L. Wilson's seaplane. The wing construction is also shown.

A Cup-winning Seaplane

THE Lady Shelley Cup Contest for Seaplanes is one of the most popular events of the outdoor season. It was won in 1935 by the elegant high-wing monoplane designed by Mr. P. L. Wilson—one of the younger members of the Society of Model Aeronautical Engineers — before re-organisation eliminated individual membership.

This 46in.-span machine is built almost entirely of balsa, and weighs only 3¾ oz., which accounts for the small size of the floats. The 1934 and 1935 contests demonstrated the efficacy of three floats of the simple, flat-bottomed pontoon type, and the Wilson seaplane employs this arrangement. The two main floats are broad in the beam but unusually shallow, the dimensions being 10in. × 1⅞ × 1⅜in., and are mounted parallel with the fuselage. The sides and planing surfaces are of 1/16in. and 1/64in. balsa respectively, the upper surface being for the most part covered with jap tissue. There are two struts between the floats, and a single strut between each float and the fuselage, supplemented by sundry bracing threads.

With a span of 46in. the wing has a chord tapering from 5⅛in. to 3½in., and the area is 198½ sq. in. The dihedral angle is about 8 deg. The leading edge is D-shaped in section, the trailing edge triangular, and the two main spars ⅛in. × 3/32in. The section is a modification of R.A.F. 32. For convenience of transport the wing is made in two parts, three bamboo prongs projecting from one half of the centre section, and slipping into light tubes on the other half.

Rectangular in section the fuselage is 30½in. in length. There are four longerons of 3/32in. × ⅛in. balsa, with cross-bracing of ⅛in. × 3/32in. The tail plane is approximately 50 sq. in. in area, the span is 16½in., and the chord tapers from 3¾in. to 2¼in. The fin is practically identical with one half of the tail plane. Wing and tail are covered with saffron yellow jap tissue, and the fuselage with dark blue, clear doped in each case. The 14in. diameter symmetrical airscrew is powered by eight strands of 1/16in. flat rubber.

The best duration achieved is 83 seconds, the average being 60-65. In the Lady Shelley contest the average dropped to 46-7 secs., through an unlucky immersion following a cross-wind take-off.

Mr. Wilson's model has also achieved success as a land-plane. It secured fourth place in the 1935 Moffett Trophy contest with a duration of 1 minute 59.2 seconds. The land undercarriage comprises two bamboo struts with 18-gauge wire springs, and rubber-tyred aluminium wheels. In this case a 16in. diameter airscrew is powered by eight strands of ⅛in. flat rubber. These modifications raise the weight to just over 4¼ oz. The average duration is two minutes.

In either guise the model is very stable, and has excellent gliding and soaring capabilities.

Hawker Monoplane's Rival ?

THE following, from a London daily paper's description of an Alexandra Palace indoor flying meeting, is too good to let slip by : "His record-breaking machine has a pull from the piece of rubber which revolves the propeller equal to 1,200 tons." The heading to this enlightening news item is "Machine Weighing ⅜ oz. Has 1,200-ton Pull." The reader also learns that the machine's microfilm covering is "three molecules thick."

More About 1936 Contests

THE first two contests will be held before *Flight's* next monthly Models page appears. That for the Pilcher Cup, on April 12, affords a try-out for intending Wakefield contestants, as the conditions are identical, while the contest for the Gamage Cup on May 3 is open to any type of rubber-driven model. Each contest will be flown simultaneously on the grounds of clubs affiliated to the S.M.A.E. Probably the best place for Londoners to see the flying will be Wimbledon Common (near the Windmill), from 3 p.m.

N.A.A. (National Aeronautical Association of America) has now approved the use of the same model, if desired, in the Wakefield Cup and Moffett Trophy contests. The former event will be flown under S.M.A.E. Rules, and the latter under those of the N.A.A. British competitors are invited to enter all contests at the three-day National meeting at Akron (June 30 to July 2).

The British Wakefield team will be selected by eliminating trials at Fairey's aerodrome on May 17, and will leave for America in the *Aquitania* on June 20.

The Sir John Shelley Cup contest for petrol-powered models will be flown at Fairey's Aerodrome on July 19, instead of in August, as originally arranged. An effort has been made to promote greater control of such models by requiring competitors to make two flights, one a left-hand circuit and the other right hand, each of precisely two minutes' duration, for which 20 points will be awarded. One point will be deducted for every 5 seconds above or below the stipulated duration, and all points will be forfeited if the model passes beyond the aerodrome boundary.

Contestants have the option of earning ten extra points for each tenth of the model's weight with empty tanks carried as dead weight, or *pro rata*, the object being to ascertain what load of petrol could be carried, and so enabling the range to be estimated without the risks attendant on unrestricted cross-country flights.

The contest announced for August 23 will be for wingless Autogiros, the average of three R.O.G. flights being taken.

On September 6 there will be a contest for biplanes with a maximum wing area of 200 sq. in., the area of either wing to be not less than half that of the other.

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Notification has been received from the Royal Aero Club that the F.A.I. is to recognise model aircraft records.

* * *

It is now announced that the 1935 Inter-Club contest for the Farrow Shield has been won by the Model Aircraft Club. Messrs. J. Worden, W. Worden and W. L. Henery totalling

546.6 secs. The Leamington and Warwick Club were the runners-up.

* * *

Messrs. R. N. Bullock, S. G. Mullins, T. Newell and C. A. Rippon have been elected Fellows of the S.M.A.E. in addition to Dr. A. P. Thurston and Messrs. W. E. Evans, A. F. Houlberg and A. E. Jones. Messrs. H. York and M. R. Knight have been co-opted to the Council for 1936.

* * *

Two British indoor records have been accepted by the S.M.A.E. Mr. E. Ross, of the Northern Heights Club, flew a fuselage tractor for 104 sec., hand-launched, at the Alexandra Palace. Mr. I. G. Brown, of the Model Aircraft Club, achieved 124.2 sec., hand-launched, with a 14in. span "spar" tractor weighing 0.062 oz., at the Horticultural Hall.

* * *

All aeromodellists are invited by the Lancashire Model Aircraft Society to participate in an exhibition, and two open contests at Manchester Airport, Barton, on April 26, from 12 noon. Particulars are obtainable from the hon. secretary, Mr. J. Castle-Clarke, 48, Mayfield Road, Whalley Range, Manchester, 16.

* * *

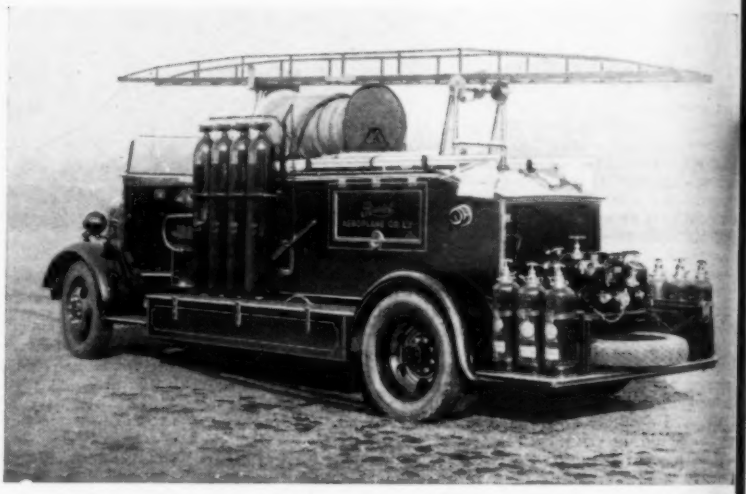
The annual "Skybird" Rally takes place at the Jehangir Hall, Imperial Institute, South Kensington, at 3 p.m. Air Comdre. Chamier is to give a talk.

THE INDUSTRY

Aircraft Components, Ltd.

APPLICATION is being made to the Stock Exchange for permission to deal in the shares of Aircraft Components, Ltd., and to comply with the requirements of the Committee particulars relating to an issue of 400,000 of the company's 5s. shares were published last Monday. These shares are being taken up by a Stock Exchange firm at par.

The company was formed recently with a capital of £200,000 to take over the well-known landing-gear manufacturing concern operated at Cheltenham since 1931 by Mr. G. H. Dowty. The assets being acquired are valued at £147,600 (of which £92,000 is represented by patent rights and goodwill), and the purchase price is £135,000, payable as £35,000 in cash and the balance in shares. The vendor company has in hand orders to a value of over £100,000. The business earned a profit of £6,142 for the six months ended February 29 last.



TWO-STAGE FIRE EXTINCTION: The new Merryweather aerodrome fire engine. The 60 h.p. chassis is equipped with a battery of CO_2 cylinders which can release 4,000 cu. ft. of gas in three minutes, thus subduing an aircraft fire in order to allow the occupants to be extricated. Immediately this has been done the fire is attacked by foam from the "Xaust-Suds" apparatus included in the equipment. Even from the water supply carried on the engine 1,000 gallons of foam can be generated. Auxiliary equipment includes such items as asbestos clothing, bolt cutters, salvage hooks and folding stretcher. The makers are Merryweather and Sons, Ltd., Greenwich Road, London, S.E.10.

Electrical Industry Vade Mecum

AIRCRAFT and component manufacturers who have, or are likely to have, dealings with the electrical industry, will find a comprehensive fund of useful information admirably arranged for easy reference in *The Blue Book*, the 1936 and 54th edition of *The Directory and Handbook of the Electrical and Allied Industries*. Containing 1,398 pages, it is priced at 25s., and is published by Benn Brothers, Ltd., Bouverie House, Fleet Street, London, E.C.4.

Change of Address

MAKERS of automobile and aircraft accessories, Auster, Ltd., of Birmingham, have now moved their London office from Great Portland Street to 2a, Central Parade, High Street, Edgware, Middlesex.

Adastral House Approves

IT is announced that F. Hills and Sons, Ltd., of Trafford Park, Manchester, have now received full Air Ministry approval for the manufacture of the Hillson Praga. An article on air impressions of this light cabin two-seater appeared in *Flight* of January 16.

For Coolness in Battle

AMONG the equipment of the Fairey Battle monoplane (described in *Flight* last week) are a Gallay radiator and oil cooler.

Gallay, Ltd., of 103-5-7-9, Scrubs Lane, Willesden, London, N.W.10, state that they can supply their cooling system "E" in cupro-nickel up to 600 mm. deep, thus permitting radiators to be designed with small frontal area and the minimum of drag.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.).

(*Published April 2, 1936.*)

22420. JOHNSON, K.C.: Airscrews (443,566).
27438. RUPP, A.: Means for fastening propellers (443,740).
27745. MILES, F. G., and POWIS, C. O.: Wing flaps for aircraft (443,651).
34376. BIAS BINDINGS CO., LTD., and TURNER, J.: Kites (443,857).
35027. DUNLOP RUBBER CO., LTD., GOODYEAR, E. F., WRIGHT, J., and TREVASKIS, H.: Aircraft brake controls (443,616).
3730. FAIREY AVIATION CO., LTD., and FORSYTH, A. G.: Variable-pitch propellers (443,750).
17555. IRVING AIR CHUTE OF GREAT BRITAIN, LTD.: Parachute packs (443,872).
22334. SHIGA, M.: Compound screw propellers for aircraft (443,763).
22489. CIERVA AUTOGIRO CO., LTD.: Aircraft sustaining rotors (443,764).

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

AIRCRAFT IMPROVEMENTS, LTD.—Private company, registered March 25. Capital, £100 in £1 shares. Objects: to carry on the business of manufacturers and repairers of and dealers in aircraft and motor vehicles, etc. The life directors are: Phiroze P. Nazir, "Marlow," Petersham Avenue, Byfleet, Surrey; Ernest G. Smith, "Newlyn," The Riding, Woking, Surrey. Regd. Office: 22, Surrey Street, London, W.C.2.

PINE'S AIRWAYS, LTD.—Private company, registered March 25. Capital, £500 in £1 shares. Objects: to carry on the business of air transport contractors. The directors are: Geo. S. Pine and Mrs. Mabel L. Pine, both of Maesyrhaf, Newton, Porthcawl. Registered office: Pine's Garage, Newton, Porthcawl.

CLYDE AIRCRAFT CONSTRUCTION CO., LTD.—Private company, registered March 25. Capital, £100 in 5s. shares. Objects: to carry on the business of manufacturers of, aircraft of all kinds, etc. The first directors are not named. Solicitors: Cosmo Cran & Co., 5, Devonshire Square, London, E.C.2.